THE IRON TRADE REVIEW

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MORE ACTIVITY

IN PIG IRON IN SOUTHERN TERRITORY.

But Prices Are Not Yet Firm—Tinplate and Sheet Plant Construction Will be Started at Once at Gary.

The continuance of heavy specifying against contracts which will expire with the year has continued to be the most important feature of the finished material market. Although buying of finished products shows some decrease as usual at this time of the year, indications are not lacking that there will be a very heavy demand during the first half of next year. The leading interest has announced an advance of $1 a ton on wire nails and common wire products. The American Sheet & Tin Plate Co. announces that it will begin at once at Gary, Ind., the expenditure of four and a half million dollars for the construction of a part of the extensive plate, jobbing and sheet mills announced some time ago. The hurling of Gompers' thunderbolt against the Steel Corporation is not disturbing anybody seriously.

Pig Iron Conditions

The fact that price concessions will sometimes stimulate business is illustrated in the case of southern iron, following the recent reduction of about 50 cents per ton. Some good sales have been made, and it is understood that two southern cast iron pipe interests have bought about 25,000 tons of iron direct from the furnaces. Prices in the south are not yet firm, however, and the quotation of $14 now freely made for prompt delivery, may be extended through first quarter. Furnaces which for sometime held at $15 for next year have taken orders with considerable alacrity at $14.50. Continuation of dullness in northern pig iron markets has had very little effect on prices. In the east, for example, the intimation of consumers of basic that they would be willing to take on additional tonnage at a concession of 25 cents per ton has met with no response from the furnaces.

Structural Material

Mandel Bros.' store building, Chicago, which will require from 10,000 to 11,000 tons of structural material, has been awarded to the American Bridge Co., which has also taken the Chicago Telephone building, 1,068 tons, and the county jail in San Francisco, 815 tons. Chicago architects have been requested to prepare plans for an immense warehouse at Budapest, Hungary, which will require about 28,000 tons of shapes. Actual bookings of the American Bridge Co. for the year will amount to about 580,000 tons, and its shops in the central and western divisions have enough work on hand to keep them busy for five or six months, but in the east, operations are not up to normal capacity. New structural shops of this company at Gary will have a monthly capacity of about 10,000 tons, but, when they are placed in operation, two other plants of the company in the Chicago district will be dismantled, so that the net increase in capacity will be only 3,500 tons per month. The Pennsylvania and other great railroad lines are not placing orders as freely as was anticipated. Fabricating prices show considerable irregularity, and seem to be lower in New York district than elsewhere. Plate business continues very heavy, and included in the past few days 5,600 tons for lake freighters, of which 3,700 tons was for a large freighter and 1,900 tons divided among three small boats. Some important manufacturers of sheets are fully seven months behind in their deliveries. Shipments on iron sheets are delayed about six weeks. A Youngstown interest expects to start its eight new sheet mills some time in January. The American Sheet & Tin Plate Co. has all its plants in operation, with the exception of the Aetna-Standard works. Some leading makers of bright tin plate have sold up their outputs throughout the first half of the year, and deliveries are naturally far behind. The leading interest this week started its Humbert plant at Connellsville, Pa., which had been idle several years. It is now operating 78 per cent of its serviceable capacity, the highest percentage since the strike was inaugurated July 1.

Crude Steel

The sheet bar outlook seems to be somewhat less indefinite, but large interests are declining to quote on forward contracts. The Carnegie Steel Co. is furnishing more than 100,000 tons of sheet bars monthly to the American Sheet & Tin Plate Co., and there seems to be little prospect that it will have any considerable tonnage for any consumers, except those already under contract. An important consumer of sheet bars in the Pittsburg territory is understood to have purchased a considerable tonnage at $29, Pittsburg, which seems to represent the market for quick shipment. Users of billets are specifying heavily. Forging billets are scarce.

Coke and Old Material

Operations in the Connellsville district are being hampered by increasing car shortage, and by the scarcity of water. Inquiries for large tonnages of furnace coke are still pending. Scrap is being imported freely from several foreign countries, but the movement is not likely to continue at the present rate as the British market is advancing, and there is a scarcity of material suitable for export. The old material market shows very little activity in any part of the country.

RAIL SALES.

New York, Dec. 15. (By wire.)

The Illinois Steel Co. reports rail sales of 7,500 tons.

The Westinghouse Air Brake Co. has declared the regular quarterly dividend of 2½ per cent, and an extra dividend of 1½ per cent and a special dividend of 1 per cent. This is one of the largest disbursements of the company in years.

THE WEEK IN IRON CENTERS

PITTSBURG.

Advance in Wire Nails and Products —Heavy Sheet and Tin Plate Tonnage.

Office of THE IRON TRADE REVIEW,
510 Park Building, Dec. 14.

The predominant feature of the iron and steel market continues to be the extreme activity of buyers in taking out their material against contracts. With the mills steadily receiving a volume of specifications that compares very favorably with the record total entered in November, makers are not greatly concerned with the apparent decline in new business, which, however, is following the precedent of other years in slowing up during the final month. Moreover, the new tonnage coming out is not inconsiderable and the prospects for renewed buying early in the new year are reported to be promising.

As has been frequently pointed out, buyers are on the alert to enter within the stated periods, their full specifications against the contracts expiring Jan. 1, many of which were negotiated at low prices, although the actual deliveries on these orders are not likely to be made before the second quarter because of the sold-up state of the mills. This condition is particularly applicable to steel bars and in a probably less degree to plates and shapes. Extending beyond this important factor, however, are the more conclusive evidences of a great and expanding consumption in such lines as sheets, tin plate and semi-finished material, in which the influence of low prices has not figured so prominently. Leading manufacturers of sheets and tin plate have sold practically their entire outputs for the first half and are receiving specifications in December at the heaviest rate for any final month in their history. In semi-finished steel, which may be regarded as a reliable index to strict manufacturing activity, some of the largest makers report their December tonnage is running the largest of the year.

As the new year approaches, the semi-finished steel market is settling to an established basis. The sheet bar market for early shipment can now be more accurately regarded as about $29, Pittsburg, with some of the mills asking higher figures on contracts. Makers report there is a heavy demand for forward bars. Billets seem to be growing scarcer and the raw steel situation has every appearance of tending toward a condition here that there may not be an adequate supply to fill all needs.

An important price advance of the week is that of $1 a ton on wire nails and the common wire products, announced by the leading interest.

Pig Iron.—Sentimental strengthening in basic is the only important development the past week of an otherwise featureless pig iron market. That grade appears in a stronger position at present than a week or 10 days ago, although there is no selling of consequence to definitely fix the market, which is generally considered at about $17.25, valley. Recently there has been a disposition by some makers to shade this price, and this fact coupled with some odd lots in brokers' hands which were seeking a buyer gave the market a somewhat dubious outlook. It is understood that there have lately been closed some transactions not to consumers, that have transferred considerable of this iron to stronger hands. Some of the smaller buyers of Bessemer and basic are beginning to sound the market and there is a moderately increased inquiry. One local steel company is asking prices on 1,000 tons of basic for first half. A small low-phosphorus tonnage is pending. Foundry iron is quiet, but there is a noticeable disposition of buyers to anticipate shipments regularly scheduled for first quarter, indicating that there has been some under-estimating of requirements in recent purchases. Other buyers are not disturbing their forward tonnage and as a result are coming into the market for small lots of prompt iron. The spot market on No. 2 is generally about $17.25, valley, but in exceptional cases $17, valley, has been done on small tonnages. It is reported that gray forge iron for forward shipment may be purchased at lower prices than have formerly prevailed. The malleable market is ruling about $17.25, valley, but lower quotations have been made. For prompt and first quarter shipment on northern iron, we quote as follows:

Bessemer, valley	$ 19.00
Bessemer, Pittsburg	19.90
No. 2 foundry, Pittsburg	18.15 to 18.40
Gray orge, Pittsburg	17.15 to 17.40
Basic, valley	17.25
Basic, Pittsburg	18.15

Ferro-Alloys.—Conditions in the alloy market are rather quiet, but there is a moderate trading being steadily carried on. A local consumer has bought an additional lot of 500 tons of ferro-manganese for first half shipment at about $45, seaboard. Some buyers who have been in the market report they are able to shade this price on small lots for prompt shipment. It is understood that some German ferro-manganese will be shipped into this territory on contracts recently placed, and while this circumstance is not unusual it may offer some explanation for low prices recently reported, since this material usually sells below standard English. There is some pending inquiry for the lower grades of ferro-silicon.

We quote ferro-manganese at from $45 to $45.50, Baltimore, prompt shipment, or for delivery this year and the first half of 1910, $45.50 to $46, Baltimore, or $46 to $47 for second half. The freight from Baltimore to Pittsburg is $1.95.

Fifty per cent ferro-silicon is quoted at $62.50 to $63.50, Pittsburg; domestic 12 per cent, $26; 11 per cent, $25; 10 per cent, $24, Pittsburg, for prompt, with $1 advance for first quarter and $2 for first half. The foreign grades are held at $1 or more a ton over domestic prices.

Plates.—The volume of business in plates is being sustained extremely well and specifications with some makers are reported to be still increasing. Deliveries are worse than they have been with some of the leading makers. Absolutely new business is fair, but not heavy, which is little more than may be expected at the close of the year. There is, however, plenty of tonnage in prospect which will likely come out after Jan. 1. Car buying at present is light, but the car builders are filled up for a number of months and are drawing heavy quantities of plates from the mills. The 6,300 tons for the Catskill aqueduct, New York, has not yet been placed with the mills, but on the extension of the Brooklyn waterworks it is reported that a Pittsburg contractor will furnish about 2,800 tons of riveted pipe. Makers report no difficulty to obtain 1.60c, but the minimum of the market still remains 1.55c on attractive business. We quote present plate prices as follows:

Tank plates, ¼-inch thick, 6¼ to 100 inches, 1.55c to 1.60c. Extras are as follows, per 100 pounds: Boiler and flange steel plate, 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.20c; marine

steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c. Plates in widths over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ½-inch to and including 3/16-inch plate on thin edge, 0.10c; under 3/16 to and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Sheets.—The movement of sheets from the mills to the trade has been very heavy this month to date, and for some companies is at a rate greater than any December in history. The tonnage is however slightly less than the enormous November total. The remarkable activity in sheets is reflected in the statement of some large makers that they are sold up fully seven months ahead. While there has been some gain in shipments, deliveries have not improved, being back fully three months on the steel product. Shipments on iron sheets run about six weeks. The Youngstown Sheet & Tube Co. is expecting to start its eight new sheet mills now building, sometime during January. The American Sheet & Tin Plate Co. has all its plants running full with the exception of the Aetna-Standard works and is operating 163 mills or 88 per cent of total capacity. We quote present sheet prices as follows:

Blue annealed sheets, Nos. 3 to 8, 1.70c; Nos. 9 and 10, 1.75c; Nos. 11 and 12, 1.80c; Nos. 13 and 14, 1.85c; Nos. 15 and 16, 1.95c; box annealed sheets, Nos. 10 and 12, 2.05c; Nos. 13 and 14, 2.10c; Nos. 15 and 16, 2.15c; Nos. 17 to 21, 2.20c; Nos. 22 to 24, 2.25c; Nos. 25 and 26, 2.30c; No. 27, 2.35c; No. 28, 2.40c; No. 29, 2.45c; No. 30, 2.55c; galvanized sheets, Nos. 12 to 14, 2.50c to 2.55c; Nos. 15 and 16, 2.60c to 2.65c; Nos. 17 to 21, 2.75c; Nos. 22 to 24, 2.90c; Nos. 25 and 26, 3.10c; No. 27, 3.30c; No. 28, 3.50c; No. 29, 3.60c; No. 30, 3.85c; painted roofing sheets, $1.70 per square for No. 28 gage, 2½-inch corrugation, and galvanized roofing sheets, $3 per square for No. 28 gage, 2½-inch corrugation.

Tin Plate.—A great demand for black plate has developed from the enameling and stamping consumers and specifications from these buyers are heavy. The black plate used by these manufacturers is the untinned product of the tin mill. Makers of bright plate have sold up their outputs for a number of months ahead, some of them for the first half, and are receiving heavy orders from buyers against contracts. This condition is keeping deliveries far in arrears. The American Sheet & Tin Plate Co. this week started three mills at its Humbert plant at Connellsville, Pa., which has been idle for several years, and it is now operating 176 tin mills or 78 per cent of serviceable capacity, the highest total since the beginning, July 1, of the strike of the Amalgamated Association of Iron, Steel and Tin Workers. We quote present tin plate prices as follows:

Coke tin plate, 100-pound basis, 14 x 20, $3.60 f. o. b. mill, Pittsburg district.

Rails and Track Material.—Much of the standard rail tonnage now on mill books is for delivery early in the year. The local mills are accordingly assured of fair operating schedules for first quarter and their rate of continued activity is dependent on the additional tonnage that may be placed by the eastern roads, which are believed to have considerable unplaced requirements for 1910. Specifications are coming in quite freely, but new business is in small lots. The light rail tonnage moving is heavy, the Carnegie Steel Co. this week having booked about 5,000 tons in specifications and new orders. The new tonnage reached about 3,700. There is no additional large buying in railroad spikes, but some makers have booked considerable business and the market is firm. We quote standard Bessemer rails as follows, the base price on open-hearth rails being $30, mill:

Fifty-pound and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; light rails on base weight of 40 to 45 pounds, $28, the schedule on the other weights being irregular and subject to negotiations; angle splice bars for standard sections, 1.50c, Pittsburg; standard spikes, 1.80c to 1.85c, Pittsburg; hand spikes, 1.80c to 1.90c, Pittsburg.

Steel.—The market in semi-finished material continues largely upon a premium basis since with such large interests as the Carnegie Steel Co., the Republic Iron & Steel Co., the Jones & Laughlin Steel Co., the Youngstown Sheet & Tube Co. and others declining to quote on forward contracts, current business is confined principally to those prompt lots which may be picked up by buyers at prices varying according to the pressure of their needs. The position of the Carnegie Steel Co. is clear since at the present time, it is furnishing the American Sheet & Tin Plate Co. more than 100,000 tons of sheet bars monthly in addition to filling the needs of other regular customers under contract. There is more definiteness to the sheet bar market, nevertheless as some of the less-important makers are now offering open-hearth material on first quarter contracts on a basis of $29.50 Pittsburg. A large buyer in this territory is understood to have taken on a considerable tonnage of bars at $29 Pittsburg and sales of several small lots of open-hearth bars for prompt shipment at $29 Pittsburg are noted. This price appears quite representative of the market for quick shipment. Sheet bar consumers continue to show a marked desire to get under contract. Billet users are specifying very heavily against their contracts and there is considerable inquiry from buyers who are wishing to cover for their forward needs. Forging billets are extremely strong and difficult to obtain while small billets are getting scarce. Forging billets were sold in this territory this week at $33 mill. A lot of 1,000 tons of small open-hearth billets for immediate shipment brought $29 Pittsburg. A steel company also closed for about 1,500 tons of open-hearth slabs.

Bessemer 4 x 4 billets with 0.25 carbon and less are quoted at $27.50 to $28, Pittsburg, with the usual extras for size and analysis, and open-hearth rolling billets from $28 to $28.50, Pittsburg. Forging billets are quotable at $31 to $32, Pittsburg. Sheet and tin bars are quoted at $29 to $30, Pittsburg.

Hoops and Bands.—Some of the principal users of hoops are contracting at this time for shipment after the first of the year, so that there is a reasonable amount of new business under way. Specifying is active and some makers have so much tonnage on hand that they are several months behind in deliveries. Prices are strong and the absolute minimum of the market is 1.55c Pittsburg. The mills rolling bands are filled up for some time to come. We quote present prices as follows:

Hoops in carload lots, 1.55c to 1.60c; in less than carload lots, 1.65c to 1.70c; bands, 1.45c to 1.50c, base, with net extras as per standard steel.

Merchant Bars.—It was scarcely to be expected that steel bar specifications would continue to run in December at the remarkably heavy record rate of November, but the present month to date has shown only a slight slowing up in

the order tonnage entered. Buyers still exhibit their purpose to specify in full, contracts expiring Jan. 1. Considerable new business is being offered principally for second quarter shipment, which some of the mills are unable to accept owing to their being sold up for that period. The price situation is unchanged and the report that the leading interest had moved its minimum up to 1.50c is not confirmed. A number of the consumers of bar iron are making efforts to cover for their needs through the first half, but makers generally are not disposed to sell beyond first quarter owing to the uncertainties of the scrap market. The bar iron market is in better shape as to business coming out or booked, and prices are unchanged. The shafting market is holding firm with makers well booked ahead. We quote the market as follows:

Common iron bars, 1.70c to 1.80c, Pittsburg; Bessemer and open-hearth steel bars, 1.45c to 1.50c; plow and cultivator, 1.45c to 1.50c; channels, angles, zees, tees, under 3-inch, 1.55c to 1.60c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds, 0.15c advance; less than 1,000 pounds of a size, 0.35c advance. Cold rolled and ground shafting, 55 per cent in carloads and 50 per cent in less than carloads, delivered in base territory.

Planished and machine straightened tire is 1.60c base; iron finished tire under 1½ by 1½ inches, 1.55c, both plus net extra on tire card; iron finished tire, 1½ by ½ and over, 1.40c, plus net extra on the steel bar card.

On cold rolled strip steel, width 1½ inches and wider, and 0.100-inch and thicker, we quote base prices for 100 pounds, $3.20 on hard, and $3.45 on soft, except in carload lots of one size where the price is lower.

Structural Material. — The leading fabricator is reported to have approximately 150,000 tons of undelivered work upon its books and it is at least three months behind in its shipments. The current volume of new structural business is not heavy which is usually the case at this period of the year, but there has been no moving up of deliveries because the mills are still as far behind as ever in their shipments of plain material. Specifications against contracts continue to reach an enormous total. Some interest is being displayed in early spring work. In this district the live tonnage now before fabricators is confined largely to contracts of the small order. There is still pending, however, from 10,000 to 15,000 tons for open hearth construction in the Youngstown district and in other localities. The 1,000 tons of sheet steel piling recently awarded the Jones & Laughlin Steel Co. by the Ontario Power Co. will be used in intake construction at Niagara Falls, Ont. Shape prices are firm and we quote as follows:

Beams and channels, 15-inch and under, 1.55c to 1.60c; over 15 inches, 1.65c to 1.70c; zees, 1.55c to 1.60c, tees, 1.55c to 1.60c; angles, from 3 to 6 inches, 1.55c to 1.60c; over 6 inches, 1.55c to 1.70c; universal and sheared plates, 6¼ inches wide and wider, 1.55c to 1.60c.

Merchant Pipe.—Considerable business for export in pipe has been offered in this district lately, and it is understood there has been some contracting of this order. At the present time there are pending inquiries for about 30 to 40 miles of 6 and 8-inch line pipe by foreign buyers. There is considerable specifying by the jobbing trade for merchant pipe, but approaching inventories are having some effect upon this movement. Some of the mills are selling through January and in exceptional cases the manufacturing trade has been protected on its requirements for a longer period. Prices are unchanged and we quote the following official discounts on merchant pipe in carloads subject to the usual additional discounts to the largest buyers.

	—Steel—		—Iron—	
	Black.	Galv.	Black.	Galv.
⅛ and ¼ inch.....	71	55	65	..
⅜ inch	72	58	66	52
½ inch	75	63	69	57
¾ to 6 inch	79	69	73	63
7 to 12 inch	74	59	68	51
PLUGGED AND REAMED.				
1 to 4 inch	77	67	71	61
EXTRA STRONG PLAIN ENDS.				
⅛ to ⅜ inch.....	64	52	58	46
½ to 4 inch	71	59	65	53
4½ to 8 inch	67	55	61	49
DOUBLE EXTRA STRONG PLAIN ENDS.				
½ to 8 inch	60	49	54	43

Boiler Tubes.—Merchant users of tubes are making efforts to close for extended deliveries next year, but some makers are not inclined to sell far ahead. Most of the boiler tube plants are now comfortably filled with business. With the increased business in tubes of the past several months, prices have steadily grown stronger, and are now holding reasonably firm, although there are occasional instances of close competition for orders. We quote the following official discounts on boiler tubes to the large buyers:

	Steel.
1 to 1½ inch.....	49
1¾ to 2¼ inch.....	61
2½ inch	63
2¾ to 5 inch	69
6 to 13 inch	60

2½ inch and smaller, over 18 feet, 10 per cent net extra.

2¾ inch and larger, over 22 feet, 10 per cent net extra.

To destinations east of the Mississippi river will be sold at delivered discount for carloads lowered by two points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburg.

	Iron.
1 to 1½ inch	43
1¾ to 2¼ inch.....	43
2½ inch	48
2¾ to 5 inch.....	55
6 to 13 inch.....	43

Wire Products.—The American Steel & Wire Co. Dec. 11 announced a general advance of $1 a ton on wire nails and the common wire products. Some of the independent makers had been nominally quoting such an advance for several weeks and makers generally had been taking on contracts for plain wire from the manufacturing trade for first quarter and first half at $1 to $2 over the current market. There is considerable activity in the market in some of the special lines including electrical wire, but the merchant trade is not ordering briskly because the season is not favorable. We have revised our prices and quote as follows, contracts with the jobbing trade being limited usually to 60 days:

Wire nails, jobbers' carload lots, $1.85; retailers' carload lots, $1.90; painted barb wire, jobbers' carload lots, $1.85; retailers' carload lots, $1.90; with 30c for galvanizing; plain wire to jobbers in carloads, $1.65, and to dealers in carloads, $1.70; polished staples, $1.85; galvanized staples, $2.15.

Wire Rods.—The advance in wire products has had a sentimental effect upon rods but no official changes have been announced, and present prices remain largely nominal, as most of the trade in this territory is covered. We quote nominally Bessemer and open-hearth rods at $33 to $34 Pittsburg.

Coke.—The unusually mild winter has kept in the background somewhat more than normally the factor of car and water shortages in the coke districts but the recent brief cold spell has brought them more clearly into prominence. The past week has noted more numerous complaints of car shortages in some sections of the operating regions, and this at times reached almost a serious stage, as two of the three principal railroads to the Connellsville district were affected. Cases were not infrequent where small plants were without a single car some days. Early this week there is some improvement to be noted in the situation with respect to cars, although the scarcity of water is still causing much concern. Labor conditions in the regions continue to grow more favorable. The coke market has not shown any especial change and the large inquiries which recently came out, including one for 30,000 tons monthly for first half, are still pending. There is some ac-

tivity in the spot market and a lot of from 1,200 to 1,500 tons of standard furnace grades for immediate shipment was closed during the week at $2.80 ovens. Foundry coke has been offered recently in limited lots for December shipment at $3.10 ovens, but most makers are asking higher prices. The foundry market is quiet. Large shippers are having less trouble to get box cars. The recent cold weather has caused larger shipments of soft coke for heating purposes to be ordered in, and the market has stiffened, ranging from $2.10 upward. We quote spot furnace coke at from $2.75 to $2.90 ovens and on contract from $2.80 to $2.90 ovens. On first class Connellsville foundry coke we quote from $3.10 to $3.25 ovens for prompt and from $3.25 to $3.50 ovens on contract. The *Courier's* report of production in the Connellsville regions for the week ending Dec. 4 shows 35,338 ovens active with an output of 444,610 tons, compared with 35,366 active ovens and a total of 445,988 tons the previous week.

Old Material.—The quiet pig iron conditions and the open winter which has been favorable for the free movement of material from dealers' yards, have both registered some influence upon the scrap market and it remains dull but fairly firm. Consumers are now drawing against their accumulations which up to this time they have had little occasion to do because of the ready delivery made on their time-to-time purchases, and they are showing no buying interest. The approaching inventory season is also having some effect in keeping consumers out of the market. The position of the dealers is one of anticipation of better prices after the buying movement is resumed and they are not showing any anxiety to sell the leading grades of steel, wrought or cast. In some of the weaker lines, sheet scrap, borings and turnings, there is a greater disposition to let go of holdings. We quote gross tons delivered in the Pittsburg district including Monesson, Brackenridge, Sharon, Steubenville and Follansbee as follows:

Heavy melting scrap	$18.00 to 18.25
Rerolling rails	18.50 to 19.00
Bundled sheet scrap	15.50 to 16.00
Iron axles	27.00 to 27.50
Old iron rails	19.50 to 20
No. 1 wrought scrap	19.25 to 19.50
Old car wheels	17.00 to 17.50
Low phosphorus	22.00 to 23.00
Machine shop turnings	13.00 to 13.50
Cast borings	10.75 to 11.25
No. 1cast scrap	17.00 to 17.25
Malleable	17.00 to 17.50
Stove plate	14.00 to 14.50

For the 11 months ending Nov. 30, exports of copper from the United States amounted to 619,252,593 pounds.

CHICAGO.

Gary Bar Mill Ready to Start—Pig Iron Dull—Finished Lines Strong.

Office of THE IRON TRADE REVIEW,
1328 Monadnock Block, Dec. 14.

The sharp contrast which has been noted, between the lethargic condition in the raw material market, and the very active conditions existing in finished lines, still is very apparent. The pig iron market is lifeless, with a tendency toward making concessions, on the part of the southern furnaces, while northern makers are "standing pat." In all lines of finished material, much firmness is noted and in some instances, such as wire products, advanced figures are ruling. The local supply of steel bars will be augmented in a short time, as the 18-inch mill at Gary, which has just been completed, is expected to be in operation tomorrow. Demand for structural material keeps up very well, and a large local contract was signed during the week. Much interest is centered in an investigation which some Hungarian engineers are making into the steel-frame construction question, with a view of applying it to the building of a large warehouse in their own country. A large tonnage of billets is said to have been contracted for by an Indiana steel mill, the source of supply being an eastern Pennsylvania steel maker. As indicating the soundness of the present activity in the steel business, it is cited that the holiday dullness, which often is very marked, even earlier than this, is entirely lacking in some lines and less marked than usual in others. It is very evident that the machinery business is enjoying a season of prosperity, from the difficulty experienced by local steel makers in securing shears and punches to add to their equipment. Delivery in from three to four months is the best which can be done.

Pig Iron.—It is apparent that a very mixed feeling prevails in the pig iron market, this week. Both sides of the contest, the buyer and the seller, seem to be sparring for wind, and neither one appears to have any definite idea of what the future will develop. In conditions of the market such as at present, abstract truth gets a bad twist, as is evidenced from the reports one hears of offers to buy or sell, which are so widely at variance that a safe mean is hard to strike. The feeling has been weaker for some time, so far as the southern irons are concerned, but there is nothing which resembles a break in the market. Northern irons are firm, and some of the southern furnaces are holding firmly to their quotation of $15.00, Birmingham, but there seems to be plenty of sources from which $14.50 iron may be obtained, for delivery over the first half of next year, and it is apparent that not nearly all of the speculative iron has been taken out of the market, which has been selling around $14.00, Birmingham. This weakness may have been accentuated somewhat by the efforts of an occasional melter to sell some of the iron which he had over-bought. The peculiar situation in which the southern iron finds itself would seem to call for a wider spread, to represent the selling of spot iron at $14.00, the willingness of some furnaces to accept $14.50, and the stand which other furnaces have taken on the $15.00 quotation. It is the opinion of some well posted men in the pig iron business that this lull in the market, and the weak feeling as to prices, may not be materially changed for some weeks. Lake Superior iron, for the remainder of the month, is quoted at $19.50, Chicago, and it is rumored that some attempt at concession has been made, from the higher prices which have been ruling for next year's delivery. The question of next year's prices for iron ore and coke, will have no small influence on the course of the pig iron market.

Lake Superior charcoal	$20.00 to 20.50
Northern foundry No. 2	19.00 to 19.50
Southern foundry No. 2	18.35 to 19.35
Southern silveries, 5 per cent silicon	19.90 to 20.40
Jackson Co. silveries, 8 per cent.	21.40
Malleable Bessemer	19.00 to 19.50
Alabama basic	19.35 to 19.85

Billets.—So far as respects the immediate Chicago market, there is no change in the billet situation, and nothing is doing aside from contracts between some of the local makers and their regular customers. Occasionally, one hears of a detached quotation for small lots, which reveals rather fancy prices, but these do not fairly reflect the market. An interesting transaction, closely connected with the Chicago market, came to light this week in the statement that a heavy producer of steel rods and wire, in Indiana, is understood to have bought 53,000 tons of rolling billets from an eastern Pennsylvania steel company. The price was not divulged.

Merchant Bars.—This branch continues to present a strong front, and there is much activity all along the line, with prices very firmly maintained. Implement makers are taking large quantities of steel, and as they anticipate an unprecedented year in

their business, the demand from that quarter will be increasingly heavy. The next few weeks are expected to develop some weak spots in the stocks which consumers have been carrying. While these stocks have been, apparently, quite heavy, and sufficient to meet all demands upon them for some time, it is expected that many gaps will be found in the assortment, which will make necessary a very liberal buying to bring the assortment up to a working basis. Some car buying is reported, one of the later purchases being by the Duluth & Mesabi, which has bought 2,000 ore cars of the Somers type.

We quote, for Chicago delivery, as follows, with prevailing extras:

Bar iron, 1.60c to 1.65c; hard steel bars, re-rolled, 1.60c to 1.65c; soft steel bars and bands and small shapes, 1.68c to 1.78c base; hoops, 1.78c to 1.88c; planished or smooth finished tire steel, 1.88c to 1.93c; iron finish, up to 1½ x ½ inch, 1.83c base, tire card; iron finish, 1½ x ½ inch and larger, 1.68c, base, bar card; channel for solid rubber tires, ¾ to 1 inch, 2.18c, flat, and 1⅛ inches and larger, 2.08c, flat; smooth finished machinery steel, 1 inch and larger, 2.43c; flat sleigh shoe, 1.73c; toe calk steel, 2.23c; spring steel, 2.28c; crucible spring steel, 2.78c; tool steel, 7c to 9c, with higher prices for special grades. Quotations on shafting are 55 per cent off the list for carload lots, and 50 per cent off for less than carload lots, carload freight allowed to points in base territory.

On iron and steel bars from local stocks, we quote, as follows: Bar iron, 2c to 2.10c, base; soft steel bars, 1.90c to 2c per 100 pounds base; soft steel hoops, 2.40c to 2.50c, full extras.

Plates.—Conditions remain as they were a week ago, and no immediate decided change is looked for, in the volume of business being accepted by the mills. Up to the present time, there is nothing to indicate that the usual holiday dullness will be as pronounced as it has been in former years.

We quote, Chicago delivery, as follows: Tank plates, ¼ inch thick, 6¼ to 100 inches, 1.78c to 1.88c. For extras see Pittsburg report.

Store quotations are without change as follows: Tank steel, ¼ inch and heavier up to 72 inches wide, 2c to 2.10c; from 72 inches to 96 inches wide, 2.10c to 2.20c; 3/16 inch up to and including 60 inches wide, 2.10c to 2.20c; 72 inches, 2.35c to 2.45c; No. 8 up to 60 inches wide, 2.15c to 2.25c. Flange and head quality, 25c extra.

Sheets.—Former quotations are being held firmly, and the market is in very satisfactory shape. Specifications for this year's delivery are all in, practically, and new business is being accepted for delivery during the first half of next year.

For mill prices see Pittsburg report. Freight to Chicago, 18 cents.

We quote store prices at Chicago as follows: No. 10, 2.25c to 2.35c; No. 12, 2.30c to 2.40c; No. 14, 2.35c to 2.45c; No. 16, 2.45c to 2.55c; Nos. 18-20, 2.80c to 2.90c; Nos. 22-24, 2.85c to 2.95c; No. 26, 2.90c to 3.00c; No. 27, 2.95c to 3.05c; No. 28, 3.00c to 3.10c; No. 30, 3.30c; galvanized sheets, Nos. 10 and 16, 3.20c to 3.30c; Nos. 18 and 20, 3.35c to 3.45c; Nos. 22 to 24, 3.50c to 3.60c; No. 26, 3.50c to 3.80c; No. 27, 3.90c to 4.00c; No. 28, 4.10c to 4.20c; No. 30, 4.50c to 4.60c.

Wire Products.—An advance of $1 per ton took place on Dec. 11. Business is coming in at a good rate, but there is some evidence of a little slacking up, as the cold weather holds on and the first of the year approaches.

We quote, Chicago delivery, for the remainder of this year, as follows:

Wire nails, jobbers' carload lots, $2.03; retailers' carload lots, $2.08; retailers' less than carload lots, $2.18; painted barb wire, jobbers' carload lots, $2.03; retailers' carload lots, $2.08; retailers' less than carload lots, $2.18; with 30c for galvanizing; plain wire to jobbers, carload lots, $1.83; staples, bright, $2.03.

Structural Material.—Quite a large tonnage is being booked by fabricating interests, and more is still unsettled. The Mandel Bros. store addition, in this city, has been let, the American Bridge Co. getting the steel fabrication, which amounts to between 10,000 and 11,000 tons; the same company will furnish the steel for the Chicago Telephone Co.'s exchange building, 1,068 tons, and 815 tons for the county jail building at San Francisco. The Denver Tramway Co.'s office building, 2,000 tons, went to the Minneapolis Steel & Machinery Co. A firm of Chicago architects, E. C. and R. M. Shankland, has been asked to prepare drawings for an immense warehouse, to be built at Budapest, Hungary, which will require about 28,000 tons of steel. If this building should be erected on the plans of a modern steel-frame structure, such as is built in America, it will be practically a pioneer of that type in Europe, as this American idea has made little headway against the ultra-conservatism found in other countries.

We quote mill prices for structural shapes, Chicago delivery, as follows:

Beams and channels, 15-inch and under, 1.78c to 1.88c. For extras see Pittsburg report.

Local store prices are as follows: All angles, 3 inches and larger, including 6 inches, $2 to $2.10 per 100 pounds; angles over 6 inches, $2.10 to $2.20 per 100 pounds base; beams, 3 to 15 inches, inclusive, $2 per 100 pounds base; channels, 3 inches and larger, $2 per 100 pounds base.

Merchant Pipe and Tubes.—The past week has shown nothing out of the ordinary routine of business in this line. This season of the year usually sees less business entered on the order books of the pipe mills, and the present year is no exception, other than that the slowing down has been a little later in the season than ordinarily is the case.

For mill discounts, see Pittsburg report.

We quote, out of store, as follows: Wrought steel pipe, black, ⅛-inch to ¼-inch, 68 per cent; ⅜-inch, 69 per cent; ½-inch, 72 per cent; ¾-inch to 6-inch, 76 per cent; 7-inch to 12-inch, 71 per cent. Iron pipe about 6 points higher.

Lap-welded steel tubes, 2¾-inch to 5-inch, 60 to 62 per cent; charcoal iron tubes, 2¾-inch to 4-inch, 48 to 50 per cent; seamless steel tubes, 2¾-inch to 4-inch, 47½ per cent.

Cast Iron Pipe.—The pipe foundries are fairly busy at the present time, and it is expected that by the first of the year, some of the larger projects for next year will begin to make a stirring. Minneapolis will have a letting on 2,500 tons on Dec. 16.

We quote as follows: 4-inch water pipe, $28.50; 6 to 16 inches, $27.50; larger sizes, $26.50; gas pipe, $1.00 a ton higher.

Rails and Track Supplies.—Practically nothing has been done in the way of sales of rails in the Chicago district. There is a quantity of business in the form of second sales, which amounts to a very respectable tonnage, and which will be closed in a short time, according to present indications.

See Pittsburg report for prices on standard sections.

On light rails, Chicago delivery, we quote as follows: Light rails, 40 and 45-pound, $26; 30 and 35-pound, $26.75; 16, 20 and 25-pound, $27; 12-pound, $28. In lots of 250 to 500 tons a reduction of 60c a ton from these prices is made; lots of 500 tons and

up carry a reduction of $1 a ton. Track supplies, f. o. b. Joliet, angle bars, 1.50c to 1.60c; railroad spikes, 1.80c to 1.90c; smaller size spikes, 1.85c to 1.90c, base; track bolts with square nuts, 2.30c to 2.55c, base; with hexagon nuts, 2.45c to 2.70c.

Old Material.—The scrap market drags along from week to week, without the expected improvement which was looked for. There is no very heavy offering and but little inquiry. Prices remain almost without change, but the tendency is toward concessions, when any departure is made from current quotations.

Old car wheels	$17.75 to 18.25
Old iron rails	19.50 to 20.50
Rerolling rails (4 ft. and over)	17.75 to 18.25
Old steel rails (2 ft. and under)	17.00 to 17.50
Light section relayers, 45 lbs. and under subject to inspection	21.00 to 23.00
Relaying rails, subject to inspection	24.50 to 25.00
Frogs, switches and guards	15.50 to 16.00
Heavy melting steel	15.50 to 16.00
Shoveling steel	15.00 to 15.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$14.50 to 15.00
No. 2 R. R. wrought	13.50 to 14.00
Arch bars and transoms	17.75 to 18.25
Knuckles, couplers and springs	14.25 to 14.75
Shafting	17.50 to 18.00
Iron car axles	21.25 to 21.75
Steel car axles	20.50 to 21.00
Locomotive tires	18.00 to 18.50
Dealers' forge	12.00 to 12.50
Pipes and flues	11.50 to 12.00
No. 1 cast, 150 lbs. and less	14.25 to 14.75
No. 1 busheling	13.00 to 13.50
No. 2 busheling	9.75 to 10.25
No. 1 boiler cut	11.25 to 11.75
Boiler punchings	16.00 to 16.50
Cast and mixed borings	7.00 to 7.50
Machine shop turnings	10.50 to 11.00
Railroad malleable	14.25 to 14.75
Agricultural malleable	12.75 to 13.25
Stove plate and light cast scrap	12.25 to 12.75
Angle bars, splices, etc. (iron)	17.25 to 17.75
Angle bars, steel	15.50 to 16.00

CLEVELAND.

More Ore Reservations—Some Inquiry For Pig Iron—Plates for Ships.

Office of THE IRON TRADE REVIEW, Browning Building, Dec. 14.

Iron Ore.—The making of reservations by furnace men continues in a quiet way. When buyers and sellers meet, there is no controversy as to prices. If a seller has some choice ores, especially of Bessemer grade, and other ores not so choice, he tries to dispose of some of the latter with the former. The dickering is almost entirely for the purpose of getting rid of the inferior ores at the same time that the choice ores are reserved.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $4.50; Mesabi Bessemer, $4.25; old range non-Bessemer, $3.70; Mesabi non-Bessemer, $3.50.

Pig Iron.—A leading interest is inquiring for 2,000 tons of foundry iron for the first half of next year, and there is also an inquiry out for 500 tons of malleable, but the pig iron market continues dull and the sales are limited to lots ranging from a carload to a few hundred tons. Prices of the northern irons are, however, not showing a disposition to sag to any alarming extent. On some business recently transacted, $17.50, valley, for No. 2 was the minimum. Recent sudden changes of temperature have had a bad effect on furnace operations, and production has been somewhat decreased. The Fannie furnace of M. A. Hanna & Co., at West Middlesex, Pa., which has been making Bessemer, will be blown out for relining this week. We quote for prompt delivery in Cleveland as follows:

No. 1 foundry	$ 18.75
No. 2 foundry	18.25
No. 3 foundry	17.75
No. 2 southern	18.35 to 18.85
Gray forge	17.40 to 17.65
Bessemer	19.90
Lake Superior charcoal	19.50 to 20.00
Jackson Co. 8 per cent silvery	20.55

Coke.—The coke market is not active, but foundries are making some inquiry for first half requirements. For prompt delivery, Connellsville furnace is obtainable at about $2.70 to $2.75, while the usual contract price is $2.80. On foundry coke, we quote, $3.15 to $3.25 for prompt, and $3.25 to $3.50 for first half. One leading producer is selling foundry coke to its old customers only, at $3.50, while several other leading interests are selling at $3.40.

Finished Material.—The heaviest business of the week has been material for boats, one order being for 3,700 tons of plates and shapes from the American Ship Building Co., for a new freighter, the steel to be furnished by the leading interest, which has also taken orders for plates and shapes for three smaller vessels, one for 650 tons from the American Shipbuilding Co., and two orders of 750 and 550 tons respectively for small vessels to be built by other shipbuilding concerns. The leading interest is now quoting 1.50c as its minimum on bars, but is not quoting at all on plates. A northern Ohio boiler concern has been endeavoring to place a contract for 2,000 tons of plates for second quarter, and it has been quoted 1.60c by an independent interest. Agricultural implement manufacturers who have specified heavily against contracts and are now far ahead on their specifications, are inquiring as to what they will be able to do for the half beginning July 1, 1910. An independent interest made a quotation of 1.50c on bars for that period. On bar iron, there is still considerable competition outside of this immediate territory. Jobbers are getting from 1.90c to 2c on both iron and steel bars out of store, and 2c to 2.10c on plates and shapes.

Old Material.—Little has occurred to affect the local scrap market one way or the other. Real business in this line is at a dead standstill, and very few predictions are being made as to the length of time prevailing conditions will last. Of course, there is a little intermittent buying to fill immediate needs in special grades, but such tonnage is insignificant and has no direct influence upon the situation. We continue to quote nominally, per gross ton, f. o. b. Cleveland, as follows:

Old iron rails	$20.00 to 20.50
Old steel rails (under 6 feet)	17.50 to 18.00
Old car wheels	17.50 to 18.00
Old steel boiler plate	14.00 to 14.50
Malleable iron (railroad)	17.00 to 17.50
Steel axles	19.50 to 20.00
Malleable iron (agricultural)	15.00 to 15.50
Heavy steel	16.25 to 16.75
Country mixed steel	14.00 to 14.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$16.00 to 16.50
No. 1 busheling	14.00 to 14.25
No. 1 machine cast	15.00 to 15.50
Axle turnings	11.00 to 11.50
Machine shop turnings	10.50 to 11.50
Grate bars	12.50 to 13.00
Pipes and flues	12.00 to 12.50
Tank iron	11.50 to 12.00
Sheet iron	6.50 to 7.00
Wrought drilling	10.50 to 11.00
Stove plate	12.00 to 12.50
Cast borings	8.50 to 9.00

CINCINNATI.

Little More Interest Shown in Southern Pig Iron Market.

Office of THE IRON TRADE REVIEW, First National Bank Bldg., Dec. 14.

Pig Iron.—While there are but few representative sales or inquiries in the market to serve as a gage reflecting the tendency of the situation, the sales offices here report that there is apparently a little more interest shown by consumers and there have been a number of requests for quotations on small tonnages. There is an inquiry from Michigan for 2,000 tons of malleable for first half delivery and an inquiry for 1,000 tons of southern iron from a car manufacturer. An Indiana melter is also inquiring for 200 tons of malleable. The leading interest in cast iron pipe is said to be testing the market, but no important tonnages have been purchased so far as can be learned. No large sales are reported. The tone of the market is easy and $14.00, Birmingham, for prompt shipment southern iron is more generally recognized as a quotable basis and there is an increasing tendency on the part of southern producers to give favorable consideration to firm offers of $14.50,

Birmingham, for first half delivery. Some consumers, who find that they are able to buy at $14.00 for prompt shipment, are contending for $14.00 for the first half on the ground that it is too near the first of the year to expect them to pay 50 cents per ton premium on forward deliveries. Northern iron remains quotable at $17.00 at furnace for prompt shipment and furnaces are asking $17.25 to $17.50 for first half delivery, but $17.00, it is believed, could be done in the Ironton district on firm offers. The weakness in the market at present is not regarded with serious concern by large interests, as reports indicate continued liberal consumption. The movement of iron has been heavy and consumers are well supplied and are generally carrying liberal stocks of low priced iron on their yards, so that the lack of demand for prompt iron is easily accounted for. But little is expected by the trade in the way of buying until after the holidays, at which time, it is believed, that consumers will show more interest in providing for their second quarter requirements on southern iron. We quote for prompt delivery, delivered Cincinnati, based on freight rates of $3.25 from Birmingham and $1.25 from Ironton, as follows:

Southern foundry No. 1	$17.75 to 18.25
Southern foundry No. 2	17.25 to 17.75
Southern foundry No. 3	16.75 to 17.25
Southern foundry No. 4	16.75 to 17.00
Southern No. 1 soft	17.75 to 18.25
Southern No. 2 soft	17.25 to 17.75
Southern gray forge	16.75 to 17.00
Northern No. 1 foundry	18.70
Northern No. 2 foundry	18.20
Northern No. 3 foundry	17.70
Jackson county 6 per cent silicon	19.20
Jackson county 8 per cent silison	20.20
Jackson county 10 per cent silicon	21.20

Finished Material.—There is continued good demand for steel and the mills are showing no tendency to catch up on deliveries. Jobbers are enjoying a good demand and are finding considerable difficulty in keeping up stocks. Prices are based on Pittsburg quotations.

Coke.—The advent of winter conditions, shortage of cars and inadequate water supply in some of the operations in the Connellsville district, in addition to the annual holiday light production, are giving the spot coke market a stronger tone and some of the low prices have disappeared. It is also reported that a number of the cheap lots have been sold and are off the market, so that efforts to duplicate recent low prices on spot furnace coke in the Wise county district have been unsuccessful. Revised quotations representing the market in the leading coke producing districts are as follows:

	Prompt shipment.	First half 1910.
Connellsville district:		
Foundry coke	$3.10 to 3.35	$3.25 to 3.30
Furnace coke	2.75 to 2.80	2.75 to 3.00
Wise county district:		
Foundry coke	2.75 to 3.00	3.00 to 3.50
Furnace coke	2.00 to 2.25	*Sliding [scale basis.
Pocahontas district:		
Foundry coke	3.00 to 3.10	3.00 to 3.25
Furnace coke	2.65 to 2.75	2.75

*Sliding scale basis means $1.60 for coke based on $9, Birmingham, for pig iron, with an advance of 16⅔ per cent of the amount over $9 at which pig iron is quoted. This is the usual basis. Other forms of sliding contracts are also made.

Old Material.—The market continues dull, but there is no important change in prices, as dealers are following out a policy of holding their supplies and not attempting to force the situation by offering at concessions. It is not denied that a little close shopping would likely result in some cheap lots of scrap being found, but the general market remains about the same as a week ago so far as quotations are concerned. Dealers' prices to consumers are as follows:

Old No. 1 R. R. wrought, net tons	$13.50 to 14.00
No. 1 machinery, net tons	13.50 to 14.00
No. 1 busheling, net tons	13.00 to 13.50
Old iron rails, gross tons	18.00 to 18.50
Old steel rails (re-rolling), gross tons	17.00 to 17.50
Old short lengths, gross tons	15.50 to 16.50
Old iron axles, net tons	19.00 to 19.50
Heavy melting scrap, gross tons	14.00 to 14.50
Stove plate, net tons	10.50 to 11.00
Heavy turnings, net	9.25 to 9.75
Cast borings, net tons	8.00 to 8.50
Car wheels	15.50 to 16.00

PHILADELPHIA.

Heavy Specifying, but Little Contracting for Finished Material.

Dec. 14.

Pig Iron.—The seasonable quiet has the eastern market firmly in its grip, current activity being limited to carload or 100-ton lots, with occasionally a block of 500 tons. There is no inquiry of consequence except in low phosphorus iron, local makers of which are figuring on several fair tonnages, chiefly for consumption in the Pittsburg district, partly for early delivery, but in one case for second and third quarter. No basic activity is noted beyond the purchase of a small tonnage for prompt shipment by a neighboring steel works at $18.75, delivered. The leading Virginia producer is planning to turn its one stack now operating on basic, back onto foundry as soon as orders on its books have been filled; its unsold accumulations of all grades are now relatively small. Punxsutawny furnace, running on foundry, will be out for about six weeks for relining. Foundries are melting at a good rate and are taking their iron in excellent shape, hence no important increase in stocks is expected in the Eastern Pig Iron Association report in connection with its meeting Wednesday. Gray forge is steady, a furnace interest enjoying a low freight refusing an offer of $17.50, delivered, on 500 tons for early shipment. Occasionally rumors of price concessions are heard, but it can be stated positively that this practice has not assumed any considerable proportions, and very little speculative iron is held in the district. Following the sale of a part cargo of No. 3 Middlesboro recently reaching this port at about $16.00, duty paid seaboard, no further importations on a speculative basis are anticipated. We quote, first quarter delivery at eastern Pennsylvania plants, as follows:

No. 1X foundry	$19.50 to 20.00
No. 2X foundry	19.00 to 19.50
No. 2 plain	18.50 to 19.00
Standard gray forge	17.75 to 18.25
Basic	18.75 to 19.00
Low Phosphorus	22.50 to 23.50
No. 2 Birmingham	19.50 to 20.00
No. 2X Virginia	19.50 to 20.00
No. 2 plain Virginia	19.00 to 19.50

Finished Materials.—Heavy specifications, coupled with relatively light contracting, continue to feature the market. Structural shapes and plates are now on a 1.60c, Pittsburg, minimum so far as eastern mills are concerned, and less competition from the Pittsburg district at $1.00 per ton lower is reported. On over-specified tonnages of bars the larger mills are charging 1.50c, Pittsburg. Eastern plate mills are beginning to drop back somewhat in deliveries, indicating a more comfortable position. Billets are steady, but rather quiet on a basis of $30.60, delivered, for open-hearth material. In structurals, the Vine street pier sub-structure has gone to E. F. Fonder, as general contractor, but the 1,000 tons of steel beams required has not been placed. There is no decision on the Reading hotel project, 500 tons, but a 400-ton building at Charleston, S. C., for the People's Investment Co. has been taken by the Bethlehem Steel Co. Local bidders are figuring on the municipal building at Springfield, Mass., on which the limit is Dec. 22. No further railroad work of importance has been closed. We quote, Philadelphia delivery, as follows: Shapes and plates, 1.70c to 1.80c; steel bars, 1.60c to 1.70c; bar iron, 1.65c to 1.70c; open-hearth billets, $30.60.

Old Material.—In view of the extremely heavy tonnage of heavy melting steel secured for the associated mills during the past month, the new buying arrangement can scarcely be said to have become operative. Foreign steel continues to come in at a brisk rate, but

this will likely show a decided decrease in the early future, as conditions on the two sides of the Atlantic have practically reversed themselves of late. The generous buying for delivery in this country, originating in the scarcity and high level of heavy melting steel, has been continued to such an extent that the British market has shown a material price advance, occasioned by the growing scarcity of material suitable for export. Meanwhile this importation movement has been chiefly responsible for the decline of the American market to a point where further purchasing for this purpose is impossible. Rolling mills are not buying and the market is otherwise quiet. We quote, gross tons, delivery at eastern Pennsylvania mills, as follows:

Old steel rails (rerolling)	$19.00 to 19.50
No. 1 steel scrap	17.50 to 18.00
Old steel axles	23.50 to 24.50
Old iron axles	29.50 to 30.00
Old iron rails	20.50 to 21.00
Old car wheels	17.50 to 18.00
Choice scrap R. R. No. 1 wrought.	20.00 to 20.50
No. 1 yard scrap	17.50 to 18.00
Machinery scrap	17.50 to 18.00
Low phosphorus scrap	23.00 to 23.50
Wrought iron pipe	16.50 to 17.00
No. 1 forge fire scrap	16.50 to 17.00
No. 2 forge fire scrap, ordinary.	9.50 to 10.00
Wrought turnings	14.50 to 15.00
Axle turnings, heavy	15.00 to 15.50
Cast borings	12.50 to 13.00
Stove plate	13.50 to 14.50

NEW YORK.

Pig Iron Business Very Light—Structural Bookings of the Year.

Office of THE IRON TRADE REVIEW,
Room 1005, No. 90 West St., Dec. 14.

Iron Ore.—The market is featureless, sales of the week being confined to a few cargoes of Spanish ore. The Wabana shipments are completed, with the exception of one cargo. The Cuban movement for the year will hardly be as large as anticipated, owing to light shipments during the early months, but will likely aggregate close to 900,000 tons. The options on Port Henry ore have yet a week to run, but many consumers have already closed for the full tonnage offered, with requests for increases.

Pig Iron. — The local and New England market shows slightly more activity than a week ago, but current business is still so light that a comparison of this sort means nothing. The continued lack of buying has developed some willingness to name price concessions on prompt delivery iron, but this tendency is by no means general and evidently is encouraged by a few furnace interests which wish to liquidate stocks on their yards before inventory time. The strength of the basic situation is evidenced by the fact that, while not making definite inquiries, several consuming interests have let it be known that they would take on additional tonnages for first half delivery at $18.50, or a concession of 25 cents from ruling prices; so far no furnaces have seen fit to comply, and we note one small sale of prompt basic at the delivered price of $18.75. Transactions of the week include 1,900 tons of various foundry grades to a New Jersey consumer on an inquiry of 3,000 tons, it is understood at slight concessions from the general level; 600 tons of Virginia foundry by a Connecticut malleable interest for first half shipment at full prices; and a scattering of smaller tonnages. The largest inquiry before the trade is for 6,000 tons. Consumption is holding up well and shipments are going forward without interruption. We quote, delivery at New York tidewater over the first quarter, as follows:

Northern foundry No. 1	$19.50 to 20.00
No. 2X foundry	19.00 to 19.50
No. 2 plain	18.50 to 19.00
No. 2 southern foundry	19.00 to 19.50
Malleable	19.50 to 20.00
Gray forge	17.75 to 18.25

Ferro-Alloys.—Transactions are so small as scarcely to test the market, though the ferro-manganese level seems to be $45, seaboard, for first half, $45.50 over the year, and $46 for last half only. There is no buying of consequence and inquiries are not important. Ferro-silicon is quiet at about $62.50, Pittsburg. Tungsten ores and metal continue scarce and high.

Finished Material.—From present indications, the American Bridge Co. will show actual bookings for the year of about 580,000 tons, against an output of about 480,000 tons, the result being the accumulation of orders by about 100,000 tons, as compared with a reduction of nearly 200,000 tons the year previous. The shops of this interest in the central and western divisions are scheduled five or six months ahead, but conditions in the east are by no means so active and the average of operations is not yet up to the normal capacity of 60,000 tons per month; the average throughout the year was about 67 per cent. Ground has been broken for the new structural shops of this interest at Gary, planned for a monthly output of 10,000 tons, but these will not be running in 1910 and on their becoming operative two present plants in the Chicago district with a combined capacity of 6,500 tons will be dismantled, leaving the net increase in capacity only 3,500 tons per month.

According to those qualified to judge, structural prices in the New York district are lower than anywhere else in the country. A considerable tonnage is being closed by the smaller fabricating interests, though no large projects are included in the awards. The absence of important buying by the leading railway interests, particularly by the Pennsylvania, is a source of surprise; the Shawmut bridge, 6,000 tons, is off indefinitely, and the Delaware & Eastern work, 4,000 tons, has gone over until next week. The Chicago & Northwestern has added 600 tons to an old contract with the American Bridge Co.; this interest will supply about 2,500 tons for elevated and subway extension work in this district, this tonnage including lots for four interests; Milliken Bros., Inc., will fabricate 500 tons for Brooklyn Rapid Transit reinforcement work; the Virginia Bridge & Iron Co. will use about 500 tons of Bethlehem shapes in a bank building at Charleston, S. C.; the Syracuse Bridge Co. has taken a 700-ton loft at Syracuse; Levering & Garrigues are to fabricate 300 tons of steel for the Nurses' Club and 800 tons for a tenement building; the Hay Foundry & Iron Works will employ about 800 tons of Bethlehem sections in a loft on Twentieth street; the American Bridge Co. has taken a 150-ton highway bridge at Wheeling; and several smaller projects have been closed. About 300 tons of reinforcing material will be required for the concrete work on pier 32, South Brooklyn, the general contract for which has been taken by H. R. Wheeler; other pending contracts include 1,500 tons of bridge work for the barge canal, bids on which close Dec. 28, a 2,500-ton loft at Thirty-fourth street and Eleventh avenue, considerable railroad work, and a number of local schools. General contractors are finding considerable difficulty in securing steel prices on which to base their bids for the Municipal Office building, to close Dec. 20, as the deliveries will run over two years, 25,000 tons being involved. The Quebec bridge superstructure, estimated at 60,000 tons of steel, will not be in the market for several months.

A fair demand for plates is noted from local boiler shops and ship yards, with eastern mills on a basis of 1.60c, Pittsburg. As deliveries will be very extended on the requirements for the 6,300 tons of riveted steel pipe in connection with the Catskill syphon contract taken by Snare & Triest, it is probable that

no general contract will be made covering the entire tonnage. The Brooklyn controversy over cast iron and steel pipe has not reached a settlement, the 8,300-ton letting having been postponed until Dec. 17, in order to permit a previous hearing on injunction proceedings brought by a taxpayer protesting against the manner of award. Bar iron is quiet at 1.50c to 1.60c, eastern mills. The Pennsylvania Steel Co. will supply 1,800 tons of T rails for a New England trolley road. Inquiries are pending for 2,000 tons from a trolley line up-state and for 1,500 tons of girder rails for Brooklyn installation. The New Haven rail inquiry has not yet been placed. We quote, New York delivery:

Angles, 3 to 6 inches x ¼-inch and heavier, 1.71c to 1.81c; beams, 3 to 15 inches, 1.71c to 1.81c; tees, 3 x ¼-inch and heavier, 1.71c to 1.81c; plates, carload, tank, 1.71c to 1.81c; marine boiler, 2.06c to 2.16c; bar iron, 1.65c to 1.70c; soft steel bars, 1.61c to 1.66c; sheets, No. 28, black, 2.46c.

Cast Iron Pipe.—New York City has opened bids on the furnishing and laying of 3,700 tons running from 6 to 16-inch. About 6,000 tons additional for the city are in contractors' hands but have not yet reached foundry books.

Old Materials. — The market is somewhat softer, though the only price change of importance is on heavy melting steel, which local dealers are now picking up in small lots at the lower prices prevailing under the new buying arrangement of the associated mills in eastern Pennsylvania. Importations are showing a decided slowing-up. Rolling mills are buying very little, but foundries are still taking on a fair volume of scrap. We quote, gross tons, New York tidewater, these being prices which dealers are willing to pay:

Old steel rails (re-rolling)	17.00 to 17.50
Relaying rails	21.00 to 21.50
Old car wheels	15.00 to 15.50
Old iron car axles	22.00 to 23.00
Old steel car axles	20.00 to 20.50
Heavy melted steel	14.75 to 15.25
No. 1 railroad wrought	18.00 to 18.50
Iron track scrap	16.00 to 16.50
Wrought pipe	14.00 to 14.50
Cast borings	9.50 to 10.00
Wrought turnings	12.50 to 13.00
Heavy cast scrap	15.00 to 15.50
Railroad malleable	14.00 to 14.50
Stove plate	11.50 to 12.00
Grate bars	12.00 to 12.50

The Pennsylvania Steel Co., of Steelton, Pa., has contracted with the Allis-Chalmers Co. for a twin tandem gas power blowing engine. The four cylinders are each 34 x 48 inches, supplied with blast furnace gas having 85 effective B. T. U.

BUFFALO.

Pig Iron Market Quiet—Interest in the Coke Situation.

Office of THE IRON TRADE REVIEW,
932 Ellicott Square, Dec. 14.

Pig Iron.—The market is quiet, notwithstanding the heavy consumption of raw material, but this is chiefly due to the fact that consumers are pretty well covered, many of the heaviest consumers having bought heavily earlier in the last half. Shipments are moving out freely at this point. There is a good deal of speculation as to prices for the first of the year, owing to the coke situation. It is believed that some interests throughout New York will not pay the coke advance if there is any way to avoid doing so. It could not be learned that any interests here had supplied their needs for coke during any part of 1910. The prices which have prevailed here for several weeks have not changed and still govern the market. It is estimated that the total selling for the past week of pig in this territory is about 5,000 tons, particularly light for this point. We quote f. o. b. Buffalo, as follows:

No. 1X foundry	$17.25 to 17.75
No. 2X foundry	16.75 to 17.25
No. 2 plain	16.75 to 17.00
No. 3 foundry	16.25 to 16.50
Gray forge	16.00 to 16.50
Malleable Bessemer	17.25 to 18.25
Basic	18.00 to 18.50
Charcoal	20.00 to 21.00

Finished Products. — Specifications are coming out slowly and with the exception of several calls for fair tonnage the market is very quiet, and the mills are crowding to gain on deliveries. A price of 1.50c on bars and 1.60c on shapes, both f. o. b. Pittsburg, still prevails. Contract customers here will find it generally impossible to get extensions on their arrangements with the mills. Few indeed are behind on specifications. Bids close Wednesday on the 350 tons required on Buffalo Foundry & Machine Co.'s proposed machine shop to be build in this city as an addition to its present foundry and machine plant. It is expected that bids will be called for Dec. 20, for 200 tons structural material for the Statler's Hotel extension. The Beaver Mfg. Co. contemplates building a factory in this city. Plans are not out.

Old Material.—The quiet condition of the scrap market continues. The buying, while light, is general in character with no change in prices. Large consumers are as yet out of the market except for special lots of old iron and are covered so far as their principal needs are concerned for some weeks, probably until about Feb. 1. The embargo at the Lackawanna Steel Co.'s plant at Buffalo, has been raised, but that interest, a notably large consumer, is not buying, having purchased heavily when the crush of business came along. We quote, f. o. b. Buffalo, gross tons as follows:

Heavy melting steel	$16.50 to 17.00
No. 1 railroad wrought scrap	18.25 to 18.75
No. 1 railroad and machine cast scrap	16.50 to 17.00
Old steel axles	21.00 to 21.50
Iron axles	26.00 to 26.50
Car wheels	19.00 to 19.50
Railroad malleable scrap	17.00 to 17.50
Machine shop turnings	12.00 to 12.50
Cast iron borings	9.50 to 10.00
Low phosphorus steel scrap	21.00 to 22.00
Old iron rails	20.00 to 21.00
Tank iron	14.00 to 14.50
Sheet iron	9.00 to 9.50
Stove plate	14.00 to 14.50
Pipe and flues	14.00 to 14.50
Grate bars	13.00 to 13.50
Boiler plate	15.50 to 16.00

ST. LOUIS.

Southern Iron Not Openly Quoted at $14—Large Coke Inquiry.

Dec. 14.

Pig Iron.—While there is very little manifestation of life in the iron market in the St. Louis territory, and none is expected until after the holidays, upwards of 1,600 tons were sold last week, mostly in car lots. Dealers in the territory as a rule insist that the furnace price for Southern No. 2, Birmingham basis, is $14.50 to $15, while others assert they can buy direct for $14. If iron is for sale at the lower figure it is not openly quoted. There is still some resale iron on the market at $14, Birmingham basis, for No. 2, however, and probably No. 2 in little quantity can be had at $14.50 for shipment over the first quarter. Ohio strong foundry iron is offered at $17 to $17.50, Ironton, for delivery over the first quarter and first half of 1910. Shipments of all grades of iron in demand continue at a rapid rate. Quoted prices, delivered, to which the Birmingham freight of $3.75 a ton has been added, follow:

No. 1 southern	$18.25 to 18.75
No. 2 southern	17.75 to 18.25
No. 3 southern	17.25 to 17.75
No. 4 southern	16.75 to 17.25

Coke.—The biggest thing in the coke market noted this week is a report from one dealer of an inquiry for 20,000 tons of furnace coke for shipment over the first half of next year. The inquiry is not generally known, but is said to have been in the hands of at least one dealer for two days. Connellsville 72-hour foundry coke is offered at from $3 to $3.25 for immediate delivery, according to the quality, and at $3.15 to $3.50 for future shipment. Connellsville 48-hour furnace coke is firm at $2.75 to $3 for immediate and future deliveries. Virginia 72-hour foundry grades are quoted at

$3 to $3.25, and Virginia 48-hour coke at $2.50 to $2.75 for immediate shipment and on contracts. These prices are all f. o. b., ovens. The freight to East St. Louis and St. Louis is $2.80, and $2.70 from the Virginia fields when shipment is destined beyond St. Louis. The price on bi-product coke is $5.80, St. Louis, for first half delivery.

Old Material.—The market for scrap iron, while by no means demoralized, is quite weak, with some sales reported at considerably less than the previous week. Quite a tonnage has been placed within the last 10 days. Our prices follow:

Old car wheels	$17.00 to 17.50
Old iron rails	19.00 to 20.00
Rerolling rails (4 ft. and over)	16.75 to 17.25
Old steel rails (2 ft. and under)	16.50 to 17.00
Light section relayers, 45 lbs. and under subject to inspection	21.00 to 23.00
Relaying rails, subject to inspection	24.50 to 25.00
Frogs, switches and guards	15.50 to 16.00
Heavy melting steel	15.50 to 16.00
Shoveling steel	14.00 to 14.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$14.50 to 15.00
No. 2 R. R. wrought	13.50 to 14.00
Arch bars and transoms	17.50 to 18.00
Knuckles, couplers and springs	15.00 to 15.50
Shafting	17.00 to 17.50
Iron car axles	20.00 to 21.00
Steel car axles	20.00 to 21.00
Locomotive tires	18.00 to 18.50
No. 1 country wrought	12.25 to 12.75
Pipes and flues	11.75 to 12.00
No. 1 cast, 150 lbs. and less	14.00 to 14.50
No. 1 busheling	13.00 to 13.50
No. 2 busheling	9.75 to 10.25
No. 1 boiler cut	11.50 to 12.00
Boiler punchings	13.00 to 14.00
Cast and mixed borings	7.50 to 8.00
Machine shop turnings	10.75 to 11.25
Railroad malleable	13.25 to 13.75
Agricultural malleable	11.50 to 12.00
Stove plate and light cast scrap	11.50 to 12.50
Angle bars, splices, etc. (iron)	17.25 to 17.75
Angle bars, steel	15.50 to 16.00

BIRMINGHAM, ALA.

Sales of Round Lots of Pig—Increased Demand for Pipe.

Dec. 14.

Several sales of good sized lots of pig iron were made the past week. One important iron factor here sold a lot of 5,000 tons for delivery over the first quarter at $14.50 per ton at the furnace, No. 2 foundry basis. Several lots of merchant iron were disposed of even as low as $14 per ton base, but no material tonnage, and for nearby shipment only. No heavy concessions have been recorded against the iron companies, but there is no doubt this is a buyers' market. The clever buyer has already met his opportunity; and the fact that he has is evidence enough that he thought he was getting a bargain even at a recession in price of 50 cents per ton from the $15 base. It is understood that several large tonnages are pending at the present time—among which is an inquiry from our largest buyer. A premium is asked and is being paid for low grade iron. The scarcity of this metal is very pronounced as compared with, say, the production of 1907. The presence of the holidays is having its effect, and no large amount of business is looked for until sometime in the early part of January next. So far as can be ascertained, there is no last half or third quarter iron offering by southern producers. Southern charcoal iron remains exceedingly firm at $22.00 per ton at the furnace.

Old Material.—The scrap iron market is practically the same as it has been for several weeks past. There is an absence of the dealer stacking additional scrap—he, evidently, preferring to hold on to what he has and await developments in the pig iron market. The demand for wrought and cast scrap is at a standstill. Dealers are asking following prices, per gross ton, f. o. b. cars here:

Old iron axles	$20.00 to 20.50
Old iron rails	15.75 to 16.25
Old steel axles	17.25 to 18.25
No. 1 R. R. wrought	14.00 to 14.50
No. 2 R. R. wrought	12.00 to 12.50
Old steel rails	12.50 to 13.00
Dealers' mixed wrought	11.00 to 11.50
No. 1 machinery	12.50 to 13.00
No. 1 steel	12.50 to 13.00
Old standard car wheels	13.75 to 14.25
Light castings, stove plate	10.00 to 10.50
Cast borings	6.00 to 6.50

Cast Iron Pipe.—The demand for water pipe has been practically the same as some weeks ago, but within the past few days there is a perceptible increase in volume of inquiries. This is usually a dull season of the year, but it seems municipalities and other large consumers are getting out their estimates for pipe to be laid later on when weather conditions are more favorable for this class of work. Prices have not changed, averaging, say $24.50 per ton at the works, with a dollar a ton advance for gas pipe.

Coal.—There has been an exceptionally good demand the past week for all grades of coal. This has, of course, been precipitated by anticipation of holiday supply to tide the manufacturer over the shut-down period—usually of a week or ten days. Prices are high, and some mines are unable to take on new business at any figures.

Coke.—The limit as to supply of Alabama coke has been reached for some time. Ovens are running to full capacity, where the output of coal will admit, and for good foundry coke $3.75 to $4.00 is being obtained. Furnace coke is easily worth $3.50 per ton at the ovens.

The Empire Steel & Iron Co. has declared the regular semi-annual dividend of 3 per cent on its preferred stock, payable Jan. 1.

SEATTLE.

Pig Iron Market Quiet—Strike Interferes with Business.

Office of THE IRON TRADE REVIEW,
302 Pioneer Bldg., Dec. 10.

Pig Iron.—Calm has settled over the pig iron market of the Pacific northwest. The foundries are well stocked for future requirements and in view of the temporarily decreasing melt, We quote, gross tons, as follows, foreign iron, ex-ship Puget Sound or Columbia river, domestic, f. o. b. Pacific coast terminals:

No. 1, English Jarrow, spot	$24.00 to 24.50
No. 1, Chinese, Han Yang, spot	23.00 to 23.50
No. 1, English, Cleveland and Jarrow, to arrive Jan., limited quantity	24.00 to 24.50
Glengarnock, Scotch, to arrive June-July	24.50 to 25.00
No. 1 English, Jarrow, to arrive June-July	24.00
Southern No. 2, domestic	25.00 to 25.25

Merchant Bars.—The trade continues quite active, but the switchmen's strike has interfered with deliveries during the past week. Local rolling mills are operating nearly up to capacity. Importations of foreign bars continue undiminished. We quote base prices for 100 pounds, f. o. b. Seattle, as follows: Common iron bars, $2.20; soft steel bars, $2.40; machinery steel, $2.80; Norway iron, $3.50; angles, channels, zees and tees, under 3 inches, $2.80.

Coke.—The railroad strike is interfering somewhat with the distribution of domestic coke. No advantage of conditions has been taken to raise prices.

Old Material.—The market for choice foundry scrap is exhibiting soft spots. Dealers are willing to shade prices for attractive business. We quote, net tons, f. o. b. Seattle, as follosw:

Foundry scrap, No. 1 grade	$18.00 to 19.50
Foundry scrap, No. 2 grade	17.00 to 18.00
Old car wheels	16.50 to 17.00
Railroad wrought	10.00 to 11.00
Miscellaneous steel scrap	5.00 to 8.00

METAL MARKETS.

ST. LOUIS.

Dec. 13.

Lead and Zinc.—White ore shipments in the Missouri-Kansas-Oklahoma district last week were smaller than they have been in months and prices remained firm. Zinc ore sold at from $50 to $52 a ton basis for 60 per cent grades, and choice lots brought as high as $54.50. Lead was stronger at $54 a ton for large lots. The basis for smaller lots was $53 a ton.

St. Louis spelter showed a decline Saturday, being quoted at $6.15, but quotations for pig lead were stronger at $4.40 to $4.50. This is taken to indicate better prices for lead ore this week or next. Calamine quotations stood

at $29 or $30 a ton for 40 per cent grades, with light shipments of this ore. Shipments of ores were lighter last week than they have been for many months. This was due to stormy weather, resulting in bad roads, and with a car shortage menacing buyers in the Webb City camp.

If the production of lead and zinc ores in the Joplin district is only moderate for the remainder of the year, the value of minerals from there for the present year will approximate $14,042,722 in value, or $1,000,000 greater than any previous year, except 1907, when the valuation reached $15,419,801. The next largest yearly output was 1906, when it reached a total of $13,427,184.

The total for the 49 weeks of the year, ending Saturday, was $13,642,722, and conservative estimates of the weekly valuation for the remainder of the year will be $300,000, or a total of $900,000, making the output for the year $14,622,722 with a possibility that it will go to $15,000,000.

The passage of the Payne bill, in which zinc ore is given a protection of 1 cent a pound on the metallic contents of imported ores, with a graduated scale fixing a lower taxation when the metallic contents are below certain percentages, prevents an influx of cheap ores from Mexico and other foreign countries that would seriously threaten the Missouri-Kansas-Oklahoma district product.

CHICAGO.

Dec. 14.

New Metals.—Copper shows no change from last week. The talk of a merger of a number of the heavy interests has revived, within the past few days, and from present appearances, the successful consummation of the deal seems very probable. Spelter is considerably weaker and may go to lower levels. Lead and tin are stronger, the latter metal being a leader in that particular. The strength is said to come from the efforts of a syndicate composed of London and Chinese capitalists, which is conducting a bull campaign in this metal.

We quote as follows: Lake copper, carload lots, 13¾c to 14c; casting copper, 13⅜c to 13½c; smaller lots, ¼c to ¾c higher. Spelter, 6.15c to 6.25c; lead, desilverized, 4.55c to 4.60c, in 50-ton lots; corroding, 25c per 100 pounds higher; sheet zinc, $8 list f. o. b. La Salle in car lots of 600-pound casks; pig tin, 34c to 34½c; Cookson's antimony, 10½c; other grades, 9¾c to 10¼c.

Old Metals.—Business in old metals is rather quiet, and not much improvement is looked for until the new year opens. Some of the items in the following list are higher, owing to the strength in the new metal.

We quote, dealers' selling prices, as follows: Copper wire, 13¼c; heavy copper, 13¼c; light copper, 11½c; heavy red brass, 12½c; heavy yellow brass, 10c; light brass, 7½c; No. 1 red brass borings, 10c; No. 1 yellow brass borings, 8c; brass clippings, 9½c; tea lead, 3.85c; lead scrap, 4⅜c; zinc, 4⅞c; tin pipe, 32c; tin foil, 29c; pewter, 23c; electrotype plates, free from wood, 4½c; electrotype dross, 3¼c; stereotype plates, 5c; stereotype dross, 3½c; prime slab zinc dross, $78 per ton.

NEW YORK.

Dec. 14.

Copper.—The rather favorable impression created by the showing of the Copper Producers' Association, which reported a decrease of about 500,000 pounds in stocks during the month, has given the market a little brighter tone, although no decided activity has resulted. The feeling now is that the proposed consolidation of producing interests will probably be put through, but at the outset on much more limited lines than originally outlined. Current business is rather light, with Lake selling on a basis of 13½c to 13¾c, Electrolytic at 13¼c to 13½c, and casting at 13c to 13¼c.

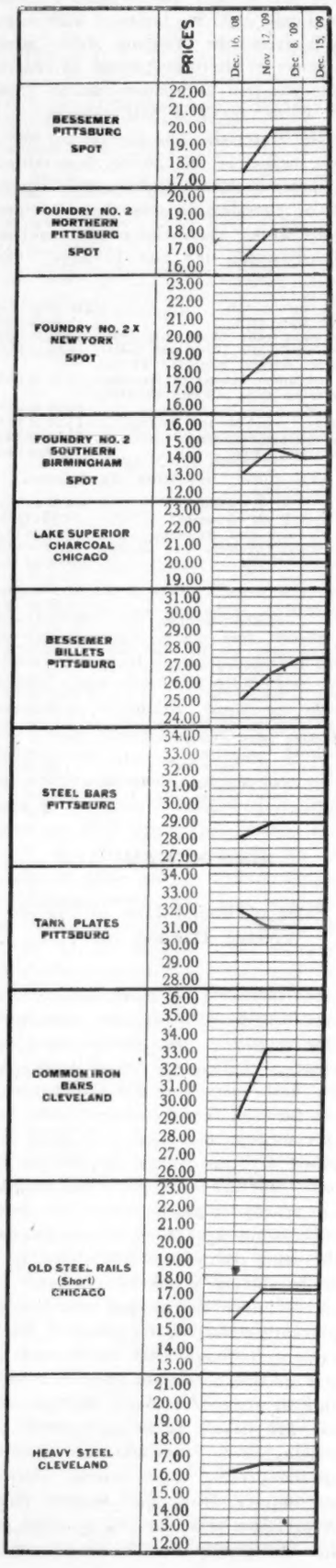
Pig Tin.—The active bull movement on the London market continues to hold the situation firmly in hand, with the result that prices on this side of the Atlantic have shown a steady advance during the week. A scarcity threatens in prompt metal, in which there is considerable activity, otherwise buyers are holding aloof. The market is now within the range of 32.25c to 32.75c.

Pig Lead.—Only a moderate volume of business is reported, with prices ruling firm at about the same level as a week ago. No marked activity is anticipated until after Jan. 1. We quote, New York delivery, at 4.40c.

Spelter.—The situation continues to grow easier from the consumer's standpoint, owing to the renewed efforts of smelters to dispose of their output. The current market, New York delivery, is about 6.10c.

Antimony.—There is no change in the situation and prices continue as follows: Cookson's, 8⅜c; Hallett's, 8c to 8⅛c; ordinary brands, 7⅝c to 7⅞c.

PRICE CHART.



LATE NAVIGATION,

WHICH HAS COST HEAVY LOSS OF LIFE AND PROPERTY,

Will be Discussed by Lake Carriers' Association—Some Great Seamanship — Season Ore Shipments.

The lake season is over with the exception of a few boats that are sheltered in the rivers and bays awaiting a favorable opportunity to reach the ports for which they set out. December has taken an awful toll of life and property in lake navigation, piling up wreck after wreck and sacrificing life after life. The gale which whipped Lake Erie and sank or crippled a number of ships was a severe one, but no worse than is to be expected during December. There was no real occasion for these vessels to be out. The cargoes which they carried might have been carried earlier; nor indeed was there much profit to be gained when the added insurance rate is subtracted from earnings. The temptation to make a few dollars, however, seems irresistible. The shipper wants the freight moved and the vessel owner is willing to risk it for the added gain. No individual is especially to blame. It is the practice. What is needed is an awakening of conscience and one man, not himself an offender, has quickened the conscience of all the rest by entering a quiet protest. His protest is the announcement that no vessel of his fleet shall leave port after Nov. 30. The president of the Pittsburg Steamship Co. has on more than one occasion proved his breadth; he now proves his humanity. He has dealt fairly and largely with all men and with all things. His leadership is of a kind that is safe to follow. Doubtless it will be followed.

The subject of December navigation is quite likely to be made a leading topic of discussion at the forthcoming annual meeting of the Lake Carriers' Association. The vessels of the Pittsburg Steamship Co. constitute practically one-fifth of the total enrollment of the Lake Carriers' Association, and the management of that company is the largest single influence in it. Coincident with the last annual meeting of the Lake Carriers' Association, a plan was evolved for a form of inter-insurance, vessel owners to carry a part at their own risk. This was done in an effort to check the steady advance in insurance rates on the lakes which has actually reached the point of being 10 per cent of the capital stock of a number of the operating companies, a charge so high as to be almost prohibitive to the small owner. The underlying thought in the inter-insurance plan was to give assurance to the insurance companies, three of which had withdrawn from the lake field, that a serious and concerted effort would be made to minimize accidents and safeguard navigation. The practical working of this plan has not yet been analyzed, but undoubtedly it has done good. Accidents have been numerous, but probably they would have been more numerous without the plan. It is clear, however, that the plan can be made more effective by avoiding certain risks altogether. The risk of December navigation certainly can be avoided by ending the season in November. The Lake Carriers' Association therefore has the opportunity to put a ban upon a practice which has entailed the loss of millions and has brought personal bereavement into scores of families.

Incidentally it might be mentioned that Harvey D. Goulder, general counsel for the Lake Carriers' Association, has received a letter from Congressman James H. Cassidy to the effect that he has received numerous letters during the past few days inquiring whether lake navigation could not be ended on Dec. 1 by legislative enactment. Mr. Cassidy makes no personal comment on the subject.

The storm last week on Lake Erie which resulted in the wreck of the bulk freighter W. C. Richardson, the Anchor Liner Clarion and the car ferry Marquette & Bessemer No. 2, brought out some distinguished features of seamanship. The picking off of the crew of the burning Clarion by the steamer L. C. Hanna was one of the most skillful acts of seamanship. The Clarion was practically a burning derelict, blown hither and thither by the wind and waves, and that Capt. Anderson could have maneuvered so large a steamer as the Hanna directly under the Clarion's stern in order that her crew might jump aboard is seamanship of a kind that would be marvelled at wherever ships are sailed. Usually crews are picked off on occasions like this in yawl boats.

The bulk freighter A. A. Augustus, building for Capt. Charles L. Hutchinson, of Cleveland, was launched from the Lorain yard of the American Ship Building Co., on Saturday last. She is in the 9,000-ton class.

The Anchor Liner Octorara was launched from the Wyandotte yard of the American Ship Building Co., on Saturday also. She is a duplicate of the Juniata, being 361 feet over all, 45 feet beam and 28 feet deep.

Season's Ore Shipments.

Ore shipments during December were 519,525 tons, making the total movement for the season of 1909 41,683,873 tons, an increase of 395,118 tons over the record of 1907 when 41,288,755 tons were moved. Following are the figures for December and for the entire season with corresponding data for the two preceding years:

Port.	Dec., 1907.	Dec., 1908.	Dec., 1909.
Escanaba	39,572	19,272	115,571
Marquette	4,466	19,305	32,367
Ashland	14,396	14,707	97,551
Superior	13,204	25,640	34 978
Duluth	.....	.....	174,177
Two Harbors	19,179	.....	64,981
	90,817	78,924	519,525

Port.	Season 1907.	Season 1908.	Season 1909.
Escanaba	5,761,988	3,351,502	5,747,992
Marquette	3,013,826	1,487,487	2,909,458
Ashland	3,437,672	2,513,670	3,834,285
Superior	7,440,386	3,564,030	6,540,505
Duluth	13,445,977	8 808,168	13,470,503
Two Harbors	8,188,906	5,702,237	9,181,131
	41,288,755	25,427,094	41,683,873

"MORAL CARNAGE"

Of Several Kinds May be Prevented If Gompers Can Collect Enough Contributions.

A conference of labor leaders held in Pittsburg completed its labors Dec. 14 and issued a statement relative to the open shop policy of the United States Steel Corporation. Samuel Gompers, president of the American Federation of Labor, presided at the conference.

The statement, which is to be sent to the president, congress and the governors of the states wherever the Corporation operates, declares the open shop policy of the Corporation to be part of an effort to crush organized labor, which is declared to be "the only factor standing between it (the Steel Corporation) and unlimited, unchecked and unbridled industrial, political, social and moral carnage."

After a considerable amount of this sort of rhetoric, the conference announces a policy of organization to extend to all the iron, steel and tinplate industries and to the related and subsidiary branches. All national and international unions of America are called upon to contribute organizers to carry out this plan and central labor organizations are asked to appoint special committees to co-operate with them.

The conference was the outgrowth of the strike of the Amalgamated Association of Iron and Steel Workers against the open shop which was declared last July.

PULLMAN SHOPS

For Repairing Cars May Be Built On Pacific Coast.

San Francisco, Dec. 11.

Representatives of the Pullman Co., Chicago, are in this city looking for a suitable site upon which to locate a repair shop for the company. Richmond Dean, general manager of the Pullman Co., and H. S. Hungerford, its general superintendent, have been looking over the ground, aided by local men who are familiar with the situation. It is understood that the company does not limit its choice of location to San Francisco and its vicinity, and has other localities on the coast upon its list of eligible sites, but its representatives express a preference for San Francisco on account of its being the main center for railroad and ocean travel on the entire Pacific coast. The establishing of repair shops as contemplated by the company, will require an outlay of $500,000, and will give employment to about 800 people.

BETHLEHEM STEEL CHANGES.

C. H. MacMillan, formerly connected with the Dominion Iron & Steel Co., Sidney, N. S., has entered the employ of the Bethlehem Steel Co. as superintendent of the No. 2 open hearth department, succeeding R. T. Harris. Karl Landgrebe, who resigned as superintendent of the blast furnace department of the Bethlehem Steel Co. several weeks ago, has been succeeded by George Winstone, who was advanced from the office of assistant superintendent of that department, and Jacob Roeber takes the place of the assistant superintendent vacated by Mr. Winstone.

SHORT WORKDAY IS FACT IN SAN FRANCISCO.

San Francisco, Dec. 9.

The workday in the iron trades was reduced 15 minutes Wednesday, Dec. 1—in conformity with an agreement entered into May 1, 1907, between the unions employed in the iron trades and the California Metal Trades Association. The original nine hours have now been reduced to eight hours and 15 minutes, lopping off 15 minutes at stated intervals. The remaining 15 minutes will be lopped off next June; then San Francisco will have the eight-hour workday for all crafts employed in the iron trades.

The Housesmiths and Structural Iron Workers' Union of this city is just now considering a proposition forbidding members of the craft and members of all kindred trades handling any structural material unless it bears the union stamp. This action is deemed necessary because local fabricators are unable to bid successfully against Eastern competitors, owing to the shorter workday and the higher wages in this city. Should the unions carry out their intention of refusing to handle manufactured steel coming from outside San Francisco, work in the iron industry may shrink in this city.

HEAVY DEMAND FOR TUBES.

The Elwood Ivins Tube Works, Oak Lane Station, Philadelphia, is five months behind on its orders and running overtime. The company draws seamless steel, brass and copper tubes as large as four inches in diameter, and recently secured contracts from the United States government and from Japan. It is operating 42 draw benches, two sets of 18-inch rolls with five furnaces, and is adding to its equipment as rapidly as possible.

WILL BUILD IN SPRING.

The Gardner Machine Co., Beloit, Wis., manufacturer of disc grinders, which recently increased its capital stock from $20,000 to $100,000, is preparing to build a new factory in the early spring. The company has been reorganized, and its control is now in the hands of F. N. Gardner, who remains president, F. E. Gardner who becomes vice president, and L. Waldo Thompson who becomes secretary and treasurer.

OFFICES AT JOHNSTOWN.

President Daniel Coolidge, Carroll Burton, assistant to the president, and O. M. Boyd, secretary-treasurer of the Lorain Steel Co., have moved their offices from Philadelphia to Johnstown, Pa. The offices were originally in Johnstown, Pa., then moved to Lorain, O., and then to Philadelphia.

Following the strike of employes of the American Locomotive Co., first at Pittsburg and later at Schenectady, N. Y., the boiler and tank makers at the Richmond, Va., plant have struck. The disputes all originated from the same cause, a change in the calculation of working time.

The Berry Rail Clamp Co. has been incorporated at Fond du Lac, Wis., by William Berry, Fred Pendell and H. T. Sackett. The capital stock is $50,000.

BRITISH IRON MARKETS.

Better Feeling Leads to Higher Pig Quotations.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Dec. 4.

In spite of political unrest which is playing havoc with business, there has been a little recovery in the pig iron market during the last three days, amounting to a penny per day, so that leading brands are now quoted at 50s 6d ($12.36) in Middlesbrough, a rise of 6d since Tuesday. Speculators are now not so keen in getting rid of their holdings as they were at the beginning of the week. On the whole, there is a rather more hopeful feeling, traders having recovered from a disappointment ensuing upon the non-arrival of American orders. They are gradually arriving at the conclusion that, independently of American buying possibilities, next year will be a more active year, and that stocks will be reduced. At present, stocks are rising rapidly, the total being 365,600 tons. This total compares with 48,000, 17 months ago. There are now in operation in the Middlesbrough district 83 furnaces, of which 44 are making ordinary Cleveland iron. Shipments are disappointing and unsatisfactory, not only with regard to America, but as to Continental markets. The firmness is somewhat assisted by the high price of coke. A few furnaces will take rather long holidays at Christmas, partly through trade dullness, but not less, because of repairs which have become imperative.

Finished Material.—In the manufacturing department, there are more inquiries for new year's business, but fewer orders for present requirements, and consequently rather more idleness at the Black Country mills, which are quite unable to keep going. The bar trade is dullest of all, the only improvement in this branch arising from advances in Belgian iron, which is now several shillings dearer than three or four months ago. There is more activity in the market for black and galvanized sheets; and wire products are being bought a little more freely; but prices are unremunerative, and entirely fail to reflect American conditions. In the steel trade, the makers are busy, and some large Black Country houses have had offers of orders to the end of 1910. But, as a rule, they insist upon substantial advances, with the result that both parties are standing aloof for the present.

RATE ON FIRE BRICK.

Commerce Commission Lowers Freight and Establishes a Principle.

Two points of considerable importance to the iron industry are decided in a recent opinion by the interstate commerce commission relating to shipments of brick in which the principle is laid down that there is no transportation reason for making different rates on the grades of fire, building and paving brick.

The commission also decides that on shipments from Central freight association territory to Trunk line territory the Chicago-New York base rate must not exceed 21 cents per 100 pounds. This decision reduces the base rate on fire brick from 25 to 21 cents per 100 pounds and prevents discrimination by making it impossible to misbill fire brick and ship it at the lower rate formerly enjoyed by paving and building brick. For obvious reasons, common building brick, which are produced in almost every community where brick are much used, and enameled brick, which are of high cost and are shipped in packages, are not included in the order made by the commission.

This victory was won as the result of a case brought in September, 1906 by the Stowe-Fuller Co., the Olive Hill Fire Brick Co., National Fire Brick Co., Minor Fire Brick Co., Davis Fire Brick Co., Ohio Fire Brick Co., Kentucky Fire Brick Co., Ashland Fire Brick Co., Tigert Fire Brick Co., Niles Fire Brick Co., and Chas Taylor Son's Co. These firms, to which the iron trade is most largely indebted for the new rate, originally contended only that the railroads were not justified in making a classification which discriminated against fire brick. At that time, the base rate on fire brick was 25 cents, while paving brick and building brick bore only a 20-cent rate. This case was fought through and in June, 1907, the commission decided that the different classes of brick ought to go at one rate. The railroads responded by publishing a base rate of 22½ cents on all classes of brick, which, after considerable legal sparring, was put into effect in January, 1908. The paving brick and face brick interests, whose rate had been raised, then took a hand and the cases were ultimately consolidated and tried with the result noted.

The commission found that under the classification made by the railroads, low grade fire brick masqueraded as paving brick or building brick and enjoyed the 20-cent rate while competing with high grade fire brick, which paid the 25 cent rate; that some kinds of high grade fire brick could be passed off as paving brick and get the lower rate, while other kinds of high grade fire brick by reason of their appearance could not be misbilled, and in general it found that "competition between the different grades of brick is of such character that no scheme of classification is possible which will not permit, if it does not encourage, the misbilling of the products in order to secure the lower rates."

On the question of a proper rate, the commission finds that the misbilling referred to had already greatly reduced the nominal rate and points out the fact that at one time the roads voluntarily charged a base rate of 20 cents on all classes. The roads conceded that it cost no more to move fire brick than the other kinds.

The new rate is ordered to take effect on or before Feb. 1, 1910.

DEATH OF MORRIS BACHMAN.

Morris Bachman, aged 43, president of the Sharon Steel Hoop Co., Sharon, Pa., and one of the most prominent men of the steel hoop industry, died at his home at Sharon, Dec. 11, after an illness of about 4 months. He was stricken with an attack of typhoid fever Aug. 1 and when apparently recovering, suffered a relapse which, complicated with heart trouble and blood poisoning, caused his death.

Mr. Bachman was born at Strasburg, Lancaster county, Pa., April 12, 1866, and was the son of a furniture manufacturer. After completing his education in the common schools, he took a special course in the state normal school, Millersville, Pa., and then entered the employ of J. W. Hoffman, iron and steel broker, of Philadelphia. Later he came to Pittsburg and was associated with Lindsay & McCutcheon, Carnegie Steel Co., William Clark & Sons and J. Painter & Sons. When the American Steel Hoop Co. was formed, he became general manager of sales with headquarters in New York. He resigned eight years ago and organized the Sharon Steel Hoop Co. which erected a plant at Sharon for the production of semi-finished material, hoops, bands and cotton ties. The company has become one of the leading makers of these finished lines.

Mr. Bachman was prominent in the affairs of his home city, being president of the Buhl Club and the Sharon Country Club. He was vice president of the Griffin Mfg. Co., Erie, Pa., vice president of the Shenango Machine Co., Sharon, director of the American Steel Foundries and was interested in banking enterprises.

TO AMERICA

Germany is Looking for Orders—Scarcity of Ores Predicted.

Düsseldorf, Obercassel, Dec. 1.

The very strong position of the money market has caused a pause in the improvement of our iron and steel market. Buyers have stopped further purchases in order to see first which course the money market will take. All works have sufficient orders for the next three to four months and some of them are even sold out until July and October, 1910. The prices remain very firm for all products, but the amount of the business is undoubtedly smaller. The domestic requirements remain unsatisfactory, but it is the export trade, which brings a compensation.

In coal and coke, there is no alteration. Some people talk of a possible strike of the Westfalian coalminers in January, but such a strike is not probable at all, as the coalmasters keep heavy quantities of coal and coke in stock. These quantities are so big that all requirements could be met during three months. Besides, the financial position of the workmen's co-operations is too weak to allow a strike.

In ores, prices are rising constantly and no end can be seen of this rise. There will be surely a scarcity of ores next year here, as America is taking great quantities and willingly pays good prices.

The trade in pig iron is dull at last prices; small parcels are sold for export to Wales and to the States, but a large quantity of pig iron is still kept in second hand for 1910. The business in rails, girders, sleepers, etc., is improving, after the state has given out some considerable orders. In bar iron, plates and sheets, producers have mutually agreed not to sell under certain prices and strong efforts are being used to syndicate these products again. As the greater part of the orders must be gotten from abroad, it is certain that we will have to follow the movements of the American and English markets, as the domestic requirements are too small to allow us to follow an independent policy.

The Canada Foundry Co., of Toronto, has been awarded a contract by the city for 2,000 lengths of 12-inch cast iron pipe at $16.75 per length or $33,500 in all. There were no other tenders. The company is building a $12,000 addition to its machine shop on King street East.

AT ONCE

Work Will be Started in Great Sheet & Tin Plate Plant at Gary.

Pittsburg, Dec. 15. (By Wire.)

President E. W. Pargny of the American Sheet & Tin Plate Co. has issued the following official statement regarding the contemplated construction by the company at Gary, Ind: The American Sheet & Tin Tin Plate Co. will start at once at Gary, Ind., on an expenditure of $4,500,000 for the construction of a number of plate jobbing and sheet mills as a part of the comprehensive plan for the construction of this type of mill at this place, together with accessories to finish the various grades of product the growing use of which demands increased output.

OPEN-HEARTH AND MILL CONTRACT AWARDED.

Pittsburg, Dec. 15. (By Wire.)

The Republic Iron & Steel Co. has awarded to the McClintic-Marshall Construction Co. the contract for the steel construction of its new open-hearth and mill building at Haselton, O. About 6,500 tons of structural material will be required. This covers the work of the open-hearth department, blooming, billet and sheet bar mills, stock house, etc.

LONDON COPPER MARKET OPENING.

London, Dec. 15 (By cable).

The copper market opened easy, spot being quoted at £59 15s and futures £60 15s, a decline of 10s for both. Spanish pig lead opened steady and unchanged at £13 1s 3d. Pig tin started easy, off 12s 6d, spot being quoted at £147 17s 6d and futures £149 5s.

PROPERTY REAPPRAISED.

A reappraisement of the property of of the Colorado Fuel & Iron Co. recently announced places the assets at $100,056,476. The liabilities are given as $81,248,147. The new appraisement was said to be ordered by John D. Rockefeller Jr. The iron ore supply is placed at 36,000,000 tons, estimated to last the Pueblo plant for 50 years. Further development of coal and coke property is also announced.

The LaBelle Iron Works, has declared a cash dividend of 2 per cent payable Dec. 31. This dividend is paid in order to make the dividend dates January, April, July and October, instead of February, May, August and November as formerly.

PERSONAL.

Charles F. Rand, of the Spanish-American Iron Co., is in Cuba.

S. L. Crim, general auditor, Interstate Iron and Steel Co., Chicago, has resigned and is succeeded by J. E. Russel.

At a meeting of the North Alabama Rolling Mills Co., held recently at Sheffield, Ala., Claude Williford was elected assistant treasurer.

Tom R. Hayward, associated with Walter-Wallingford & Co. at Pittsburg, who has been seriously ill, is now convalescent.

W. D. Park, president of the Union Sheet & Tin Plate Co., who was stricken with heart failure in the company's offices at Pittsburg, several days ago, is reported improving in condition.

Judge E. H. Gary, chairman of the United States Steel Corporation, will arrive at Birmingham, Ala., Thursday, and will spend several days inspecting the Corporation's plants in that locality.

Alfred Lorenz has been appointed general manager for the Deemer Steel Casting Co., at New Castle, Del. He was formerly manager for the Keystone Steel Foundry Co.

G. Louis Boissevain, a member of the executive committee of the Knickerbocker Trust Co., of New York City, has entered the board of directors of the Pocahontas Fuel Co.

G. P. Bassett Jr., Commonwealth building, Pittsburg, has been appointed exclusive agent in the Pittsburg territory of the Dayton Coal & Iron Co., Dayton, Tenn., maker of high phosphorus foundry iron.

John Booth, who recently resigned as superintendent of the Federal Steel Co., Chester, Pa., has been succeeded by James Merritt. Mr. Merritt held the same position some years ago, and is now returning to it.

William J. Breen, for some time resident manager of the Boston office of Hugh W. Adams & Son, Inc., handling the Sloss-Sheffield company's iron in New England, is no longer connected with that interest.

William H. Baldridge, vice president, representing the Phillips Sheet & Tin Plate Co. in the east, has changed his office address from 17 Battery place to 1722-1724 Hudson Terminal building, 30 Church street, New York City.

Wylie L. Byers, who was formerly engaged in the coke business in the Connellsville region, has been appointed by J. K. Dimmick & Co., Philadelphia, as manager of the Uniontown office of that firm at Uniontown, Pa.

Emil Swensson, a Pittsburg engineer, has been appointed the expert of the State Railway Commission of Pennsylvania to superintend carrying out the reforms in the Pittsburg street railway situation recommended by the commission.

A. K. Barker, in charge of the scrap department of B. Nicoll & Co., has resigned to enter the same business for himself with offices in the Singer building. It is understood Nicoll & Co. will discontinue the scrap business except in specialties.

Judge George W. Woodruff, of the United States Court at Honolulu, Hawaii, has just resigned this appointment to accept the secretaryship, in connection with duties of a legal-advisory character, of the Pocahontas Fuel Co. and the Pocahontas Consolidated Collieries Co., New York.

Prof. Kenneth G. Smith, of the college of engineering, University of Illinois, has been elected director of the University of Wisconsin extension work in Milwaukee. Prof. Smith was formerly superintendent of the shops of the Kerr Steam Turbine Co., Wellsville, N. Y., later being connected with the Westinghouse Machine Co.

Waddill Catchings, for some time secretary for the receivers of Milliken Bros., Inc, has been appointed assistant to the president of the Central Foundry Co. Chas. E. Marlor, superintendent at the Milliken plant during the receivership, has also become associated with the Central Foundry Co., as general manager of its foundry operations.

OBITUARY.

Daniel W. Church, at one time one of the engineers employed by the Pittsburg Bridge Co., died in Chicago Dec. 7, aged 56. At the time of his death, Mr. Church was chief assistant city engineer in Chicago.

William Richards, for many years one of the firm of William Richards & Son, Warren, O., died at the home of his son in Ironton, O., Dec. 8, aged 60 years. His father, William Richards, was one of the pioneer iron men in northern Ohio. His brother, S. A. Richards, is manager of the Struthers Furnace Co., Struthers, O.

Charles P. Withington, Akron, O., who invented the first self binding reaper, died in Janesville, Wis., Dec. 12. Mr. Withington was born at Middlebury, now a part of Akron, O., in 1830, and moved to Janesville when he was 17. He began experimenting with the grain binder in the early 60's, and obtained a patent in 1870. This patent was sold to Cyrus McCormick in 1874. For 20 years thereafter, Mr. Withington was associated with Mr. McCormick in the harvester business.

SOFT STEEL

Seems to be Victorious Over Iron On the Pacific Coast.

By a general informal agreement, the iron and steel merchants of the Pacific coast have established a permanent differential of 20 cents per 100 pounds between the price of soft steel bars and common iron bars. The store price of steel bars is at present $2.40 base, per 100 pounds, while common iron bars are sold for $2.20.

The recognition of this differential, which carries with it a tacit admission of the superiority of soft steel for certain purposes, marks the virtual conclusion of a long and bitter fight to introduce soft steel on the Pacific coast. The successful introduction of soft steel is the result of the efforts of the Dunham, Carrigan & Hayden Co., San Francisco. The principal exponents of common iron on the Pacific coast are the Pacific Hardware & Steel Co., San Francisco, Portland and Seattle and the Seattle Steel Co., Seattle.

Up to two years ago, the consumption of steel bars on the Pacific coast was about one-third and that of iron bars two-thirds the total consumption. At present conditions are just about reversed. To bring this about, steel bars were sold for a long period, the struggle for their introduction dating back six years, practically at cost and at times as low as the price asked for iron bars. A great many comparative demonstrations, tests and investigations of the relative merits of iron and steel bars were made. Considerable money was spent in missionary work among the country blacksmiths, teaching them the proper methods of working and welding soft steel so as to get the best results. Dunham, Carrigan & Hayden Co. also published a booklet entitled "Soft Steel vs. Common Iron," which set forth in detail tests of the two products, methods of working steel and arguments favoring the use of steel for general forge work. For cutting threads on steel bolts, a special die was designed having a larger angle of rake than an ordinary die. This die produces a more perfect thread on steel bolts than is possible with the ordinary tool.

Soft steel bars are now firmly established in the Pacific coast iron market and consumers have been educated to the point where they are willing to pay a higher price for steel. Nevertheless it has also been shown that common iron cannot be driven out of the market. For certain grades of work, iron is perfectly satisfactory and its low cost is always a factor in its favor. So while soft steel is being widely used, the manufacturers of iron bars have not suffered materially.

CUSTOMS DECISIONS.

The board of United States general appraisers at New York rendered the following decisions in customs cases:

Date of Effect.

Merchandise which was entered in New York on July 26, 1909, for immediate transportation in bond to Los Angeles and which upon arrival in Los Angeles was entered there on August 13, was held dutiable under the provisions of the Payne tariff, which took effect on Aug. 6, 1909. The ground for the decision was that under a ruling of the United States circuit court of appeals in Ellison vs. United States (142 Fed. Rep. 732) the collector of customs at New York did not acquire jurisdiction of the merchandise until it came into his possession and that, in order that there may be such jurisdiction, the importer would have to enter the goods for consumption in New York.

Wire Fish Hooks.

In the cases of Hibbard, Spencer, Bartlett & Co. against assessment of duty in Chicago. The assessment was at 40 per cent plus 1¼ cents per pound and the claim was that the duty exacted should have been at specific rates per pound plus 1¼ cents per pound under the wire paragraph of the Dingley tariff. The question to be determined was whether the wire was valued at more or less than 4 cents per pound. Wire from 16 to 18 Birmingham wire gage has been valued at divers times above and below 4 cents per pound and hooks made therefrom have been held dutiable accordingly. In these questions, 17 wire gage fish hooks were held not dutiable at 40 per cent because the value of the wire from which made was not over 4 cents per pound.

Metal and Wood Vacuum Cleaners.

The merchandise was held dutiable at 45 per cent as manufactured articles in part of metal in the absence of proof that they were in chief value of wood.

Rough-Bored Rifle Barrels.

The merchandise was assessed at 45 per cent under the Dingley tariff as "manufactures of metal, not specially provided for" and was claimed dutiable at 25 per cent as "rifles and parts thereof." The paragraphs in the Payne tariff read as they did in the Dingley act and the ruling is therefore controlling upon the new act.

Platinum Weights.

Platinum weights for chemical scales were held free of duty under the Dingley tariff (paragraph 653 of Payne act) for "apparatus, vessels and parts thereof, composed of platinum for chemical uses." The assessment at 45 per cent was accordingly reversed.

VIRGINIA IRON OPERATIONS.

It is learned that the present intention of the Virginia Iron, Coal & Coke Co., now operating one furnace on basic and two on foundry iron, is to run the former on steel-making iron only until present contracts are filled, turning it then to foundry. This is taken as an indication that this interest will not compete actively with the basic furnaces in this district, from which it took considerable business at one time in the autumn. The limited basic tonnage included in its large accumulations has been cleared out, in common with its low grade irons and a good part of its foundry, unsold stocks on hand now being less than one-third of the maximum tonnage held. There has been some further selling of basic in the eastern Pennsylvania district on a basis of $18.75, delivered, which continues the minimum figure.

COPPER PRODUCERS' REPORT FOR DECEMBER.

The official report of the Copper Producers' Association for Dec. 1, showing the production and consumption of copper in pounds in the United States for November and the stocks on hand on Dec. 1, follows:

	Nov.	Oct.
Stocks	153,509,626	151,472,772
Production	121,618,369	124,657,709
Total	275,127,995	276,130,481
Domestic delivery	66,857,873	66,339,617
Exports	55,266 595	56,261,238
Consumption	122,124,468	122,620,855
Stocks remaining	153,003,527	153,509,626

This shows a decrease on Dec. 1 of the stocks of copper by 506,099 pounds from the stocks on hand Nov. 1.

An addition 35 feet square is being built to the Auburn Foundry, Auburn, Ind., which will be used for the manufacture of brass and aluminum castings.

Port Henry (N. Y.) furnace, of the Northern Iron Co., blew out Nov. 25 for relining and repairs.

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January	5,506
February	5,346
March	5,396
April	5,508
May	5,533
June	5,551
July	5,572
August	5,597
September	5,609
October	5,628
November	5,634

December 16, 1909

EUROPEAN STEEL ON THE PACIFIC COAST.

A most significant announcement has recently been made regarding the importation of structural material on the Pacific coast. In the November issue of the *Monthly News Letter*, published by the California Metal Trades Association, the announcement in couched in the following language:

The structural steel interests within the California Metal Trades Association recently made a decisive move which will probably bring about the long fought for differential freight rate between plain and fabricated material from points east of the Mississippi to Pacific coast terminals. The local fabricators will hereafter buy foreign material almost exclusively. Nor are they alone in the fight, thanks to the persistent efforts of Commissioner H. W. Kerrigan, for both the shops in Los Angeles and in the north are now agreed that this is the only effective means whereby the Pacific coast fabricators can gain recognition for their rights before the Trans-Continental Freight Bureau.

The Pacific coast steel fabricators feel that the freight rates on structural material from the east are not adjusted so as to give the western shops the opportunity they should have in their own market. The most pernicious feature of the present tariff from a Pacific coast point of view, is the so-called structural steel grouping. The grouping as set forth on page 71 of the latest westbound freight tariff is as follows:

Angles, channels, beams, columns, girders, zees and tees, not over 32 feet long; bridge, wharf, gas house and structural iron and steel, fabricated or unfabricated, consisting of: anchor rods, angle bars, beams, braces, bridge railing, channel, circular frames, columns, corrugated flooring, girders, joist hangers, nuts and bolts, piling, plates, No. 11 and heavier, punched or not punched, bent or not bent, post caps and bases, pulleys, rails, riveted and cast shoes, rivets, rods, sidewalk and floor plates, truss bars and corrugated bars for reinforcing concrete construction, trusses, tees, tubing, washers, weights and zees, minimum carload weight 30,000 pounds for each car used.

The freight rate is 100 pounds from all points east of Mississippi on materials included in the above group. The less than carload rate is $1.30 per 100 pounds.

By means of this grouping, an eastern fabricator can ship mixed carloads of a great variety of materials at a low carload rate, whereas in order to obtain the same rate the western firm must ship in straight carloads. The Pacific coast fabricators maintain that this entails an unnecessarily large investment in materials and places the west at a disadvantage. If supplies, such as rivets, bolts, nuts, rods, plates, etc., are shipped to a Pacific coast shop to be worked up there, they are not classed as structural material and do not receive the mixed carload benefits conferred by the structural steel grouping.

It will be noted also that the tariff makes no distinction between plain and fabricated material. The western plants contend that the plain material should be carried at a lower rate.

This is the situation as it exists today. The Pacific coast firms have been importuning the Trans-Continental Freight Bureau for over two years. No real progress has been made. They have now decided to use coercive measures. What degree of success will attend their efforts, remains to be seen.

It must be admitted, however, that on account of the avowed intention of the Pacific coast fabricators to seek European markets, the problem has become much more important to the iron and steel world at large.

We do not want the structural steel business of the Pacific coast handed over to foreigners. The business, even at present, is worth fighting for—it amounts to about $15,000,000 a year—and the tonnage is bound to increase from year to year. Already about 25 per cent of the steel used in the Pacific states is foreign.

In San Francisco, 80 per cent of the structural material erected is fabricated in local shops. At other points the proportion of business held locally is not so large; probably 65 per cent would be a good average for the entire Pacific coast. If 65 per cent of the steel used by coast fabricators is purchased in Europe, which under the present agreement is quite within the range of possibility, it will result in a direct loss of $6,300,000 annually to American steel manufacturers and a loss in freight receipts of $3,360,000 a year to the trans-continental railroads. It will also give the European mills a splendid entering wedge into a business which is lucrative at present and which has excellent prospects for future growth.

We are not concerned directly with the quarrel between the Pacific coast fabricators and the railroads, but it does seem that steps ought to be taken to prevent foreign interests getting a foothold in the west and it appears that the railroads for their own protection, as well as in the interests of the steel business, ought to make some concessions. Domestic beams are held at 2.40c today on the Pacific coast and it is well known that foreign material can be imported for 1.90c.

The only reason more foreign material is not used is found in the

fact that the European mills do not roll standard American sections, and the majority of architects' specifications are based on American sections. This is causing some confusion and in cases where the nearest foreign section is heavier than the American standard, the heavier section must be used, which increases the total cost of the foreign material. Should the business warrant it, however, the European mills would undoubtedly roll American sections.

Although the Pacific coast is a long distance from Europe, the freight rates in sailing vessels and tramp steamers seeking outbound wheat and lumber cargoes are very low. San Francisco and Seattle, as far as freights are concerned, are frequently quite as close to the European market as is New York. There is no doubt that the foreign steel makers are face to face with an unusual opportunity to secure a large slice of American business.

PIG IRON PRODUCTION.

Our monthly statistics of pig iron production, presented in last issue, show a rate of output at the close of November of 84,654 tons per day, excluding charcoal pig iron. Assuming the charcoal pig iron rate to be 400,000 tons a year, the rate of production of pig iron by all fuels was approximately 31,300,000 tons annually.

The prospect is that the record output for a calendar year, the 25,781,361 tons made in 1907, will be closely approached this year, if indeed it is not exceeded. Taking the official figures for the first half of the year, with our own reports of coke and anthracite pig iron production in the past five months, assuming the Nov. 30 rate to be continued through December, and estimating charcoal pig iron in the second half of the year at 200,000 tons, there would be shown an output for the calendar year of about 25,675,000 tons.

It is only the extremely heavy rate of production in the past few months which has made such a large total possible for the calendar year. The first half production this year was only 11,022,346 tons, or 1,300,000 tons short of the poorer half of 1907 and 2,450,000 tons short of the better half of that record year.

It is interesting to observe what will be accomplished in the way of output for a twelvemonth if the present rate of production is carried unchanged into next year. Continuing the rate of Nov. 30 for four months, or through March 31, the total pig iron production of the country in the 12 months ending March 31 would prove to be about 27,600,000 tons, nearly 2,000,000 tons in excess of the actual make in the calendar year 1907. Such a record would easily exceed the best performance for any 12 consecutive months in the past.

There is room for some increase in the production rate in the next few months, but not a great deal. The rapid expansion in output in the past few months has almost exhausted the resources of the furnaces. Our record of average daily output shows a low point in the recent movement of 34,316 tons, the daily average in January, 1908. After an increase for two months and a decline for two months another but subsidiary low point was found of 36,876 tons, the daily average in June, 1908. Each subsequent month showed an improvement, until 60,051 tons was reached in February of this year. For two months production declined, to 57,788 tons in April, after which month the steady increase was resumed, reaching an average of 84,402 tons last month. The increase in the seven months was 26,614 tons, equal to the output of no less than fifty 500-ton furnaces, or at the rate of seven such furnaces per month.

There are no furnaces lying idle or approaching completion to furnish a similar quota for the coming months. Since Nov. 30, an Aliquippa and a Gary stack, both new, have been blown in, and two more Gary and two more Aliquippa furnaces are approaching completion. Altogether six or eight new furnaces may come in within a few months. Of old furnaces yet to come in, there are very few. With unlimited demand for the product, the changes in furnace activity in the next few months cannot be altogether in the line of additions. In recent months few furnaces have gone out for relining, because so many were relined during the depression, but as the months go by, the proportion out for relining will increase and approach the normal. Thus it may be concluded that while the rate of production Nov. 30 was about 31,300,000 tons a year, the rate in the next few months may be pushed above the 32,000,000-ton mark, but cannot be brought up to the 33,000,000-ton mark. Less than two years ago, the rate dropped below 13,000,000 tons, so that the change from pauper to prince has been more sudden, probably, than anyone would have expected.

LIMITING THE LAKE SEASON.

President Coulby, of the Pittsburg Steamship Co., has taken a highly commendable stand in numerous important matters since he was chosen to preside over the great fleet of the United States Steel Corporation, and his progressive ideas concerning labor are well known. They are briefly and comprehensively expressed in this doctrine: "Treat your men fairly, and there will be no necessity for a labor union or trouble from labor." Under the leadership of such men as Coulby and Sheadle, a welfare plan, which has already 10,000 workingmen as members, is being successfully carried out. Much might be said of the wisdom of the Coulby policies, but we wish especially at this time to call attention to the declaration made by President Coulby last week, that hereafter, with the Pittsburg Steamship Co., the lake season will end Nov. 30, as it did with that company this year.

Last week on Lake Erie 52 lives were lost, and property valued at about a million dollars was destroyed, simply because of the greed of a few men to make more money. Both shippers and vessel owners were to blame, and we are glad to say that not one of the vessels lost was carrying ore. Ore shippers are busy throughout every season when there is any justification for action, but some shippers, especially those of coal, daudle along through

the summer months when many vessels can be chartered at moderate rates, and then rush in at the end of the season and by offering high premiums in the form of excessive freight rates, tempt vessel owners to risk the lives of their men in fighting ice and storms to deliver to upper lake ports coal that should have been carried during balmy summer weather.

Following Mr. Coulby's declaration in favor of limiting the season, President Livingstone, of the Lake Carriers' Association, expressed himself in a similar vein, and we hope that the association will not wait to be forced by the insurance companies to adopt this policy, which is so plainly demanded by the interest of humanity and enlightened business.

HEAVY PIG IRON PRODUCTION IN EASTERN PENNSYLVANIA.

Harrisburg, Pa. Dec. 12.

Heavy pig iron production is marking the work of the various furnaces in this section of Pennsylvania. With exception of three or four furnaces in Lebanon, Lancaster and York counties, everything is in operation, and at the Pennsylvania Steel Co.'s stacks in Steelton, bonuses are being earned.

Another furnace will be added to the active list in the Reading district as soon as repairs can be completed to one of the largest furnaces.

The $4.50 puddle rate has been announced at Lebanon and at the Chesapeake Nail Works, in this city. In Harrisburg the rate became effective on Dec. 1.

Considerable interest has been attracted in the iron and steel company offices by the action of the legislative committee in charge of the new state taxation laws in asking for advice and information from companies. This action, which is unusual, is generally commended, as it will give everyone a chance to present views.

WILL BUILD COKE OVENS.

The Jamison Coal & Coke Co., Pittsburg, is actively proceeding with the development of the large tract of coal land recently acquired which is located near Fairmount, W. Va. Two shafts are being sunk and a third is planned. As soon as the property is properly opened, the company will begin the construction of a block of coke ovens and will actively manufacture for the market.

IMPORTANT AWARD

Made to Cleveland Cliffs Iron Co. by Michigan Supreme Court.

Marquette, Mich., Dec. 13.

Reversing the decision of the circuit court in important mining litigation, Michigan's supreme tribunal has awarded to the Cleveland Cliffs Iron Co. title to two 120-acre tracts of valuable mineral lands near Bass lake, in the Swanzey district of the Marquette iron range. Both properties are in township 45, range 25 west, and it is said that as a result of diamond drill exploration there is assurance that both will be large producers of ore when their deposits are opened. Title was claimed by Marquette county men who had purchased the lands from the heirs of a member of a real estate firm. Deeds from the firm itself are held by the Cleveland Cliffs company, and these are upheld by the supreme court. It is said that the lands are worth well up in the hundreds of thousands of dollars.

PARIS STEEL LISTING SYNDICATE IS DISSOLVED.

The announcement is made in Paris that the syndicate of French bankers, which was said to have been formed for the purpose of listing United States Steel Corporation common shares on the Paris bourse, was dissolved a few days ago after liquidating its holdings. Herman Harjes Jr., of Morgan, Harjes & Co., is quoted as saying:

The proposition to list Steel emanated from influential French financial circles, who saw in the introduction of American securities a prospect for renewing the former activity of the Paris bourse, and at the same time opportunities for advantageous investment for the French public. As the entering wedge, they selected Steel common. Steel was then quoted at 64. It is now selling at 91. In the meantime, the dividend doubled.

During this interval transactions in Steel on the New York exchange were considerably larger than those in any other stock, so that the object the interested parties had in view would have apparently been more than fulfilled, and it seems regretable that the French public did not have a chance to participate in the profits of the transactions.

NEW ELECTRIC COMPANY WILL CONTINUE BUSINESS.

The Virginian Electric & Machine Works, Charleston, W. Va., announces the purchase of the plant, business and patents of the Agnew Electric Co., of Charleston, and will continue the manufacture of direct current motors, automatic rheostats, bronze rotary pumps, and electrical apparatus formerly made by the Agnew company. All the agreements and contracts made by Edwin M. Keatley, as receiver of the Agnew Electric Co., will be carried out by the Virginian Electric & Machine Works.

CONTRACT FOR BUILDING SPIKE AND BOLT PLANT.

W. Ames & Co., operating the Jersey City Spike & Bolt Works, 312 Washington street, Jersey City, N. J., have awarded to the V. J. Hedden & Sons Co., 1 Madison avenue, New York City, the contract for constructing the following buildings on Communipaw avenue, Jersey City: Spike and bolt shop, 65 by 280 feet; mill building, 50 by 210 feet; storage building, 50 by 150 feet; machine shop, 50 by 100 feet; and office building, 30 by 40 feet. Chas. H. Higgins, 15 Exchange Place, Jersey City, is the engineer of building construction. This concern was established 50 years ago; its products now include track and screw bolts, railroad, boat and dock spikes, bolt ends, splice bars, tie rods and bar iron.

WILL BUILD THREE NEW BUILDINGS.

The New Process Steel Co., Marshall, Mich., has begun work on three new structures, a foundry, 65 by 125 feet for the manufacture of malleable steel castings, in connection with the firm's crucible steel castings; a building for the annealing department, 75 by 100 feet, and a pattern vault. The foundry and annealing buildings are of brick and cement construction and will be completed by Jan. 15, 1910, but the ends of both buildings will be left open and sheathed with corrugated iron with a view to further extensions in the near future. The new work was undertaken with a view to giving better accommodation for current work and to provide for business expansion.

WILL BUILD AUTO SPRINGS IN NEW PLANT.

The National Spring Co., Newcastle, Ind., which was recently organized, will engage in the manufacture of automobile springs exclusively. Josiah Fowler and his son, R. R. Fowler, of St. Johns, N. B., who have had a long experience in the manufacture of springs will be in charge of the concern. Contracts have been let for the buildings, and the machinery is ordered. The company expects to produce about 10 tons daily.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS

Report of the Proceedings of the New York Meeting—Interesting Discussion of "The Measurement of the Flow of Fluids," Steam Engineering Topics, Gas Producers and the Control of Rolling Mill Engines

The thirtieth annual meeting of the American Society of Mechanical Engineers, held in the Engineers Societies' building, New York City, Dec. 7 and 10, was marked by the introduction of several innovations in the conduct of these gatherings. The number of professional papers was reduced, thereby giving the members more opportunity for social intercourse, and the number of papers assigned to each meeting was curtailed to afford more time for satisfactory discussion. This arrangement was heartily approved and was generally favorably commented upon. The meeting was largely attended, and the presence of an unusually large number of ladies added brilliancy to the social functions. In addition to the inspection of the new passenger station and terminal of the Pennsylvania railroad, many excursions were provided to manufacturing plants and power stations in New York City and immediate vicinity, and to the local committee great credit is due for the completeness of the arrangements of these inspection tours. Papers on kindred subjects were again assigned to separate sessions, "Measurement of the Flow of Fluids" having been the general subject discussed Thursday morning, and in the afternoon the papers presented related to steam engineering.

Annual Business Meeting.

The annual business meeting of the society was held Wednesday morning. The total income for the year amounted to $77,719.13, while the expenditures were $73,486.34. The estimate of current expenses for the next fiscal year was placed at $80,480. The library committee reported that during the past year further steps have been taken in the evolutionary process of administering the libraries of the American Institute of Mining Engineers, the American Institute of Electrical Engineers and that of the American Society of Mechanical Engineers, as far as practicable, as a unit. This process involved the development of a comprehensive plan whereby the library of each society maintains only books in which its membership is particularly interested, treating all other publications in its library as duplicates. To the American Institute of Mining Engineers have been assigned the subjects of mining engineering, geology, mineralogy, chemistry, metallurgy, and a part of chemical technology. To the American Institute of Electrical Engineers the subjects of electrical engineering, electricity, physics, mathematics and pure science. To the American Society of Mechanical Engineers, general engineering, railroad engineering, mechanical engineering, civil engineering, and a part of chemical technology.

The meetings committee outlined the policies which have been adopted looking toward the further condensation of paper by the elimination of all superfluous and irrelevant matter, or matter previously printed, and of such statements of facts as are of common knowledge in the profession; the presentation of a subject, wherever possible, in such a way as best to permit of a general and thorough discussion, and to this end to extend invitations to those, whether members or otherwise, whose experience has been such as to bring out the most valuable discussion of the subject. At the annual and semi-annual meetings a reduction of the number of professional papers is recommended, and of the number of papers assigned thereto, in order that more opportunity may be given for satisfactory discussion and for social intercourse between the members. During the year the membership committee held seven meetings, at which a total of 361 applications for membership were considered, and 339 recommended. The research committee reported that it is now gathering existing information upon the subject of safety valve efficiency. Reports of the house and publication committees were also received.

Standardization Committee Report.

The report of the standardization committee of the gas power section was submitted by C. E. Lucke, chairman. At the first meeting of this section a committee was appointed to standardize, so far as seemed practicable, the use of terms, and the practice of making guarantees of performances for gas engines and producers and the determination of their fulfillment. The general recommendations made in this preliminary report were as follows:

All terms made in a guarantee should be defined. All guaranteed quantities must be capable of measurement, and only one acceptable mode of measurement should be specified.

There should be no conflicts of quantities.

Builders best serve their own interest, when units are in terms most satisfactory to the purchaser, and hence involve only input and output for definite fuel, horsepower and time.

Builders' ratings are matters of private interest to facilitate shop procedure and cataloging; they should not be used in guarantees, but may be used in describing the engine to identify it with public records.

Standard forms of specification, and guarantee are undesirable as cumbersome and sometimes inadequate, actual conditions being seldom twice the same.

The legal nature of a guarantee must be kept in mind, especially as the terms and procedure involved are not matters of common knowledge; in case of controversy, courts must interpret by attempts to get at accepted practice in the art through experts, in the legal sense, who may not be so in the scientific and engineering sense and may be more interested in protecting their client than in arriving at truth.

Capability should not be guaranteed, but only actual performance. Failure to meet a test requirement does not prove lack of capability. A given gas having repeatedly produced an m. e. p. of 80 in an engine, another similar engine is capable of 100 horsepower, when its dimensions and speed with m. e. p. of 80 figure 100 horsepower, even though it never did so.

The time element in any observation or number of observations, per result or method of averaging, should always be kept in mind. How long a run is necessary to prove the horsepower, how long a count to get the revolutions per minute, and how often, how many tests to prove the B. T. U. per cubic feet of gas, and how long each, are all questions to be understood by both parties.

Steady conditions should be established, or be expressly stated as prerequisite and not be left as implied.

Substantial fulfillment of some things is fulfillment, whereas literal fulfillment is necessary for others. Margins should be established and agred upon.

Expense of test and conduct should be borne by the builder except when the purchaser imposes unfair requirements, in which case he should be informed of the cost and be required to bear it. This is especially important

when long runs are contemplated, requiring relays of skilled observers, or when gas measurements require meters, or where the purchaser's expert tries to show how much he knows by insisting on absurd refinement or untried schemes of test invented by himself.

The output energy of the producers equals input energy of the engines without correction or qualification, except when some gas generated is used for auxiliary purposes. For complete plants the guarantee should be over-all performance only.

When complete plants are guaranteed by one party the guarantee should relate only to producer input and engine output.

In tests for fulfillment no other data than that required by contract conditions should be taken, with no exceptions.

The place and time of operation and test for fulfillment should always be expressly stated.

Builders should always expressly reserve the right, and sufficient time, for preliminary tests for adjustment and take complete advantage of the opportunity.

Original records, with signatures and date stamps, should be kept for all fulfillment test data and it should be expressly agreed that a copy be given to the party not in possession.

Plant Operation.

The report of the Plant Operations committee of the gas power section, which was only preliminary, contained a large number of forms to be used in connection with the operation of gas power plants, which would show the load curve for various times of the year; cost, character and amount of material used in operating; repair material, cost, etc.; operating labor as to the number and character of men, wages, etc.; repair labor, cost, etc.; detailed dimensions of the plant and data sheet on reliability of operation. Following these suggestions the committee prepared forms, as follows: Producer log for a daily report of the operation of the producer plant; engine log for daily report of the operation of the engine plant; load curve form for plotting the load on the station for any desired day; monthly data sheet intended for the collection of data obtainable from the daily station records, pay rolls, etc., so as to present a comprehensive monthly statement of the operation of the plant; monthly cost sheet and a dimension sheet.

WEDNESDAY AFTERNOON.

On Wednesday afternoon a large number of the members accepted the invitation extended by George Gibbs, chief engineer of the Pennsylvania Tunnel & Terminal Railroad Co., to inspect the new Pennsylvania passenger station and terminal. This is by far the most extensive public service plant and one of the greatest engineering accomplishments in the world. In addition, many small parties visited manufacturing plants in New York City and immediate vicinity during the week. Invitations were extended to the members and guests of the society by the following concerns: International Steam Pump Co., Henry R. Worthington Hydraulic Works, Harrison, N. J.; Harrison Lamp Works of the General Electric Co., Harrison, N. J.; Fifty-ninth Street Central Power Station of the Interborough Rapid Transit Co., New York City; National Phonograph Co., Orange, N. J.; De La Vergne Machine Co., New York City; Gramercy and Stuyvesant central offices of the New York Telephone Co.; plant of the Crocker, Wheeler Co., Ampere, N. J.; Westinghouse Lamp Co., Bloomfield, N. J.; waterside stations, Nos. 1 and 2, of the New York Edison Co.; Brooklyn Rapid Transit Co., Williamsburg power station; Rockland Electric Co., Hillburn, N. Y.; Singer Mfg. Co., tower and power plant of the Singer building; Trenton Iron Co., Trenton, N. J., and the Watson-Stillman Co., Ampere, N. J.

On Wednesday evening, a paper entitled "The Era of Farm Machinery," illustrated by lantern slides, was presented by L. W. Ellis, of the Bureau of Plant Industry, United States department of agriculture.

THURSDAY MORNING.

Four papers presented Thursday morning formed a symposium on the "Measurement of the Flow of Fluids." The first, entitled "Tests on a Venturi Meter for Boiler Feed," by Prof. C. M. Allen, Worcester, Mass., is summed up as follows:

The object of these tests with the venturi meter was to determine how well adapted it would be for use in measuring the feed to a boiler, in view of the variety of conditions under which it might have to operate. The methods of pumping the water through the meter, the different temperatures of the water pumped, various and fluctuating pressures and velocities of flow—any one or several of these conditions might be met with in actual service, and the results obtained indicate that such occurrence would have practically no effect on the satisfactory performance of the work of the meter.

However, there are limits to this satisfactory operation of any one meter, and the lower limit for this size seems to be reached when the velocity of the water through its throat becomes lower than about 10 feet per second. In case the desired amount of water is smaller than the quantity which would produce this velocity in the meter, a smaller meter would be installed. It is evident from these tests that the venturi meter is sufficiently accurate for the majority of commercial or engineering requirements.

Pitot Tube as a Steam Meter.

An abstract of an able paper on "The Pitot Tube as a Steam Meter," by George F. Gebhardt, Chicago, which was read by the secretary in the absence of the author, is given below:

The application of a pitot tube system, as described in the paper, is an accurate means of determining the *velocity* of steam at any point in a pipe, provided the values of the various influencing factors are known; and for straight lengths of piping with continuous flow, under these conditions, it is an accurate means of determining the *weight* of steam flowing.

Under average commercial conditions in which the pressure and quality of the steam fluctuate and an average value must be taken for the density of the self-adjusting water column, only approximate results can be obtained, the extent of error varying with the degree of fluctuation.

For velocities in excess of those corresponding to a 1½-inch water column (about 2,000 feet per minute for pressures over 70-pound gage pressure), tests gave a maximum error of about 2 per cent for continuous flow in straight lengths of piping.

Steam Turbine Nozzles.

In 1905 a series of tests was begun at Case School of Applied Science, Cleveland, to determine the proper proportion and the efficiencies of steam turbine nozzles for given steam conditions. The final tests were given in a paper, entitled, "Efficiency Tests of Steam Turbine Nozzles," prepared by Prof. F. H. Sibley, University of Alabama, and T. S. Kemble, experimental engineer for the Chase Machine Co., Cleveland, and is briefly as follows:

The object of the tests was to determine the efficiency of various shaped nozzles with steam flowing from a given initial pressure to a known vacuum; also to determine the effect on the efficiency of changing the angle of divergence.

Two methods were tried out for finding this efficiency: (a) by first finding the pressure in the nozzle by means of a search tube placed axially in the nozzle; (b) by finding the reaction of the nozzle. This was done by suspending the nozzle in an air-tight box at the end of a flexible steel tube. The deflection of the tube caused by the reaction of the

nozzle, was measured by a calibrated spring. Friction was eliminated. Preliminary work was done to calibrate the springs, to determine the volume of flow of the various nozzles and to determine the pressure in the nozzle and the surrounding medium.

The results of the tests indicate: (a) that the reaction is affected by a difference in pressure between the muzzle of the nozzle and the medium surrounding the nozzle; (b) that the efficiencies of the various nozzles were determined within a probable error of 2 per cent; (c) that the efficiency is affected more by the smoothness of finish on the inside of the nozzle than by the exact contour of the nozzle.

It was pointed out, in the ensuing discussions, that the high efficiency obtained would undobutedly prove a surprise to those not familiar with recent developments in the construction of nozzles. It was suggested that the uncertainty of moisture in the steam may have been overcome by the use of superheated steam, and it was also stated that more data were required on the proper lengths of nozzles to use.

Electric Meter.

The meeting closed with the presentation of a paper by Prof. C. C. Thomas, Madison, Wis., in which he described an electric meter for measuring the rate of flow of gas or air, which can be adapted for use as a steam meter or as a steam calorimeter, taking the quality of all the steam passing through a pipe instead of that of a sample of steam. The operation of the gas meter depends upon the principle of adding electrically a known quantity of heat to the gas and determining the rate of flow by the rise in temperature of the gas, between inlet and outlet. The construction of the meter is briefly, as follows:

The meter consists of an electric heater formed of suitable resistance material disposed across the gas passage so as to impart heat at a uniform rate to the gas. The resulting rise of temperature is measured and autographically recorded by means of two electrical resistance thermometers, one on each side of the heater. These consist of resistance wire, wound upon metal tubes so placed that all the gas passing through the meter comes in close proximity to the therm meters. The adoption of this principle of operation permits the construction of a very accurate and sensitive autographic meter of large capacity containing no moving parts in the gas passage; independent of fluctuations in pressure and temperature of the gas, and capable of measuring gas or air at either high or low pressures or temperatures. The electrical energy required is about 1 kilowatt per 50,000 cubic feet hourly capacity, at the pressures ordinarily used in gas mains.

THURSDAY AFTERNOON.

In addition to the regular session held in the main auditorium Thursday afternoon, the Gas Power section convened in the lecture hall to receive reports of committees and to elect officers. Five papers on steam engineering subjects were presented at the regular meeting of the society.

"Tan Bark as a Boiler Fuel," by David M. Meyers, New York City, which was briefly discussed by A. A. Cary, William Kent and L. P. Breckenridge, is given in abstract, as follows:

The average fuel value of spent hemlock tan is about 9,500 B. T. U. per pound of dry matter, which is about 35 per cent of its total moist weight in the fire room. The available heat value per pound as fired is 2,665 B. T. U. One ton of air-dry hemlock bark produces boiler fuel equal to 0.42 tons of 13,500 B. T. U. coal. The degree of leaching does not affect the number of heat units per pound of dry matter, but of course reduces the available material.

Boiler tests under normal conditions show thermal efficiencies of from 58 to 68 per cent, and a higher efficiency has been obtained under special conditions.

Tan presses have produced no marked increase in boiler and furnace efficiency when tested; with the same efficiency, however, an increase of about 5 per cent of steam for the same amount of tan bark may be expected owing to the increase of available heat units in the "tan as fired." Grate surfaces should be materially reduced when tan is pressed.

Mixing coal with tan under proper conditions increases both the capacity and the efficiency of boiler and furnace. Conditions productive of best results have been: Ample combustion space, and a refractory arch over the entire grate; no less than 0.5 inch and preferably 0.6 inch water-gage draft with ample draft passages; feeding through holes in top of furnace in small quantities and at frequent intervals to approximate the rate of combustion; constant care to prevent blow holes; a small shallow-fired furnace; a high arch above the fire (which is about the most important single requirement); proper ratio of heating surface to grate surface for local conditions; the pressing of tan under certain conditions.

Cooling Towers.

A paper on "Cooling Towers," by J. R. Bibbins, New York City, evoked considerable discussion, and some of the deductions made by the author were questioned by several of the members. Quotations of forced draft towers suitable for a load of several thousand kilowatts, not including the motor or engine for driving the fans, received by Mr. Bibbins from a number of builders and which ranged between $4.80 and $6.93 per kilowatt, were considered high, and it was stated that the prices must have been made on an installation requiring maximum service conditions. The paper is briefly, as follows:

Developments of recent years in both steam and power plants have demonstrated the usefulness of the cooling tower. This piece of auxiliary apparatus has always been more or less neglected. In some plants the maximum effectiveness of the cooling tower and that of the condensing plant are in a sense diametrically opposed—one profits by the shortcomings of the other. The tower works best when the vacuum is lowest. On the other hand this tends to a general operative equilibrium and often saves the day when two interdependent types of equipment would succumb. Fortunately, improvement in condensers is being actively pushed, the trend being to secure higher hot-well temperatures. This immediately enhances the effectiveness of the cooling tower. Similarly, in gas power plants, the possibility of cooling jacket water by means of this apparatus is favored by the high temperatures of discharge, which prevail in engines of good construction. It is not an impossible state of affairs for the jacket water in a gas power plant to cost more than the fuel, if not cooled and used over again.

In the discussion of this paper it was pointed out that cooling towers have been utilized in this country for practically 25 years, and what is believed to have been the first installation was made in Illinois in 1884, the tower having been designed after types in use in Germany. For more than 10 years the cooling tower has been on a scientific basis in the United States, and the building of this equipment is now, in itself, an engineering specialty. It was stated that neither the excessive cost of cooling towers nor the lack of knowledge of their proper construction restricted their use in this country, but rather the fact that nature was more bountiful in her provision of good water supply in this country than abroad. So many statements in the paper were questioned that the author decided to embody his answer in a written reply.

Governing Rolling Mill Engines.

A device, intended to reduce the steam consumption of rolling mill engines and at the same time to re-

lieve the greatest strains on the engine and the mill, was described in a paper entitled "Governing Rolling Mill Engines," prepared by W. P. Caine, Ensley, Ala., and read by the secretary in the author's absence. This device consists of an adjusting screw on the governor, which is intended to prevent the governor from dropping to a position which would allow the maximum amount of steam to reach the cylinder. While the tests were conducted the steam was admitted nearly three-quarters of the stroke. The point at which the screw is set must be such that the engine will carry an average load and also will not stop under a heavy load. The success attained by this adjustment was graphically shown by a number of continuous indicator cards and tachometer speed curves.

The paper is given in part as follows:

In considering the conservation of steam power equipment for driving rolling mills, we must take into account the two methods of rolling: The two-high mill driven by a reversing engine, and the three-high mill driven continuously in one direction; and the relative amount of power required for each.

There is very little variation in the type used for each class of mill. Twin engines are used for two-high mills and single engines for three-high mills, usually tandem compounds.

The reversing engine for the two-high mill must be powerful enough to take care of the engine and mill friction and the maximum torque produced by the piece in the rolls in any position. As these engines are usually twin engines with cranks at 90 degrees, each side must be capable of doing the work alone when the other side is on the dead center.

In determining the size and distribution of the metal in engines of this type it is the custom to make the dimensions a little larger and the parts a little heavier than have been used before for the same work. Reciprocating parts are made heavier to stand the shocks, thereby increasing their inertia, and making necessary heavier frames, bed plates, bearings and pins, as well as more rigid adjustments, which in turn require more attention.

As an example of the power sometimes used for an engine of this type, a certain engine may be cited which was fully capable of delivering 25,000 horsepower, while the actual average work on the steel passing through the mill could not have required more than 2,000 horsepower at the maximum capacity of the mill. The engine and mill friction, if the mill were driven continually in one direction, would not fall much short of 1,000 horsepower. Assuming that each reversal would absorb 50 horsepower, and that there were 10 reversals per minute, 500 horsepower would be consumed in this way. The total average work of the engine was thus about 3,500 horsepower, only one-seventh of its capacity.

As the three-high mill is driven continually in one direction, the energy stored in the flywheel makes it possible to do the same work with considerably less than one-half the maximum power required in the former case, the amount depending upon the size and weight of the flywheel. The greater the amount of energy the wheel can store up, the closer can the maximum power required approach the average work of the mill, resulting in the more economical use of steam and a lower cost of equipment.

Mill designers do not always give sufficient consideration to this fact and operators have to deal later with high steam cost and difficulty in keeping the proper steam pressure. Of course, there are other features to be considered, but economical use of power is a very important item.

For driving a three-high mill a twin engine of the cross-compound type could be used with an intercepting valve such as is employed in locomotive practice, by which the engine could be started from any position and handled by a quick-acting throttle valve, so that it could be brought to a standstill as soon as a piece passed through the rolls, if another were not ready to enter the mill. Such an arrangement would go a long way toward answering one of the principal arguments in favor of the two-high mill: that its engine uses steam only when the piece is on the mill.

If an engine of the type described be furnished with a very heavy flywheel located between the engine and the mill, the shocks due to the piece striking the rolls will be taken very largely by the flywheel and not by the engine. Furthermore, if the engine were so designed that it could not work through the wide range of steam admission, as is the current practice, the abnormal amount of compression now necessary would be cut down to a large extent, the parts of the engine would be strained less, and the engine would run with greater steam economy owing to the cutting out of the high release pressure during heavy work and the reduction of the number of strokes during the period of negative work.

Going into the details of operation of an engine driving a three-high mill, we find:

a That the engine first develops just enough power to take care of the friction of engine and mill.

If the engine were running at a constant speed during this period, just enough steam would be admitted to the cylinder at each revolution to do the work with the least possible variation of cut-off, resulting in the most economical use of steam. The more the speed varies the greater the amount of steam required per horsepower developed.

A constant speed is also desirable for another reason, namely, the available energy stored in the flywheel is always normal under these conditions, whereas with a varying speed it would be below the normal about one-half the time. Should the piece strike the rolls when the steam pressure is low and the steel cold, the engine would be more liable to stall if the stored energy were below normal than if it remained constant.

b Next, the piece strikes the rolls. The initial force of this blow is absorbed by the flywheel and the speed of the engine is reduced in consequence. When this has dropped, say four or five revolutions, the governor has probably so adjusted the steam valves that the engine is developing its maximum power and the valves will remain in this adjustment until the engine is nearly up to speed again. During this time the release pressure will be high, making it necessary to carry a very high compression, conditions under which a non-condensing engine will make the most noise. Further, if the steam going to waste were utilized the engine would be capable of doing about one-third more work.

c Next, the piece leaves the rolls. On many passes the engine is receiving the maximum amount of steam at this instant and the flywheel absorbs energy through the increase of speed above normal. In the writer's opinion, this is the time when nearly all of the failures of flywheels on rolling mill engines occur, and anything that can be done to cut down the amount of energy to be absorbed by the wheel at this time will increase the safety of the engine and decrease the repairs on the engine and mill.

Having in most cases reached the highest point of speed, the governor will shut off steam entirely from the cylinder, the engine will slow down to several revolutions below normal speed before sufficient steam will be admitted to increase this speed again, and the result will be a wide range of the speed variation during the first period when the engine has simply to overcome its own friction and that of the mill. The operations outlined in the foregoing are very complicated when two or more passes occur at the same time.

The results of a study of the above details of operation of the No. 1 rail mill engine driving the four-pass roughing rolls at the Ensley rail mill of the Tennessee Coal, Iron & Railroad Co., during a series of tests show how great a difference in the performance of the engine the writer was able to obtain with one adjusting screw added to the governor.

Discussion.

In a written discussion prepared by Henry C. Ord, it was stated that the conservation of energy as applied to rolling mills received very little attention until the last five or six years. The power required to roll a given piece of steel was not known until the continuous indicator and the recording tachometer were applied. Steel manufacturers prefer the two-

high reversing mill to the three-high mill because it can be easily reversed should a piece not enter the rolls properly. For this reason, some of the modern three-high, electric motor-driven rolls are fitted with an emergency reversing device. This reversing feature can also be used as a quick safety stop in case of accident. Furthermore, two-high mills are not so complicated as three-high mills as they have a smaller number of rolls and no mechanism for raising and lowering the tables. In considering the two systems the latter is an item of power that should be charged to the three-high mill. It was also added that power is not the only consideration as it is usually a question of the maximum tonnage in a minimum time.

The 25,000-horsepower engine described is a 42-inch and 72-inch x 54-inch twin-tandem horizontal compound condensing blooming mill engine, built by the Allis-Chalmers Co., Milwaukee, for a mill requiring an average of about 6,000 horsepower, which is also approximately the economical load for the engine. It was designed for a maximum of 25,000 horsepower under the following conditions: Steam pressure, 150 pounds gage; cut-off three-quarter stroke; revolutions, 200 per minute. This machine has been described as the most powerful engine in the world and has a piston speed of 1,800 feet per minute.

Referring to the controlling device, Mr. Ord stated that it has no control over the engine before the load is increased until the speed falls to that fixed by the adjusting screw. At this speed and power the engine will be doing the maximum work allowed by the adjusting screw and consequently the control can only be applied to engines that have a longer range cut-off than is required for the greatest loads they have to carry. Therefore, to prevent the engine being stalled before reaching the latest cut-off for which it was designed, the services of the adjusting screw would have to be dispensed with. When the adjusting screw is in control, the engine will also slow down much quicker than without it, and the engine would be stalled by a lighter load. As engineers prefer to have engines with some power in reserve to take the abnormal load, it was believed that they would hesitate to use any method of control that eleminates the reserve power of the motor to which it is applied.

Electrically-Driven Mills.

James Tribe ventured the opinion that but little, if any, substantial advantage can be gained in heavy blooming mill work by the three-high mill so long as it is steam driven. The only hope of any improvement in economy over present practice will be in the use of the present two-high reversing mill, electrically-driven. In such an equipment there would be provided the necessary power to avoid delay in gripping the ingot, the means for instantly throwing off the power at the release of the ingot, and also the continuously running steam engine with a sufficiently heavy flywheel at the generator.

Leaky Boilers.

F. W. Dean, Boston, related "An Experience With Leaky, Vertical Fire Tube Boilers," which is given briefly as follows:

The boilers, which were somewhat over 10 feet in diameter and contained over 6,000 square feet of heating surface, leaked badly very soon after being started, and nothing that was done improved their condition until the water legs were lengthened from 2 feet to 7 feet 2¼ inches. The boilers were raised 5 feet 2¼ inches. Before they were raised the lower ends of the tubes would cover with very hard clinker and become stopped up. This clinker could be removed only by cutting it off when the boilers were cold. After the boilers were raised, a light clinker that could be blown off formed about the tubes; by removing this by blowing every three or four hours the leaks were stopped and they have never returned.

The trouble varied with different kinds of coal. Each boiler had been run constantly at over 1,000 horsepower and the economy seemed to be about the same no matter what the power was. So far it has been difficult to obtain good combustion, but the heat-absorbing power of the boilers is admirable. The experience with these boilers indicates that there is no ordinary limit to the size of a vertical fire-tube boiler.

Prof. L. P. Breckenridge, who presided at this meeting, said that the paper was of great value to the Society, inasmuch as it recorded a failure, whereas the members are only inclined to note their successes. The opinion was expressed that possibly the combustion chamber was too small and that the tubes were entirely too long.

Col. E. D. Meier believed that the deposit at the ends of the tubes was largely carbon and related an experience with boilers installed at the World's Fair grounds, Chicago. No less than 10 different types of boilers were exhibited, all fired with fuel oil, and all lost tubes. The exhibitors were at a loss to account for this, but later, when the boilers shown by Col. Meier were shipped to California, no further difficulty was experienced with the tubes, although fuel oil was used. The burners were directed downward and placed low. It was believed that drops of oil, not thoroughly vaporized, were deposited on the tubes at the Chicago plant and the carbon of the oil adhering to the tubes caused blisters, which in a short time made it necessary to replace the tubes.

Longitudinal Joint for Boilers.

"The Best Form of Longitudinal Joint for Boilers" was the subject of another paper presented by F. W. Dean, and is abstracted as follows:

This paper dealt especially with the defects of the usual form of butt joint used on the longitudinal seams of boilers, in which the inside strap is wider than the outside strap.

While stating that there has never been an explosion of a horizontal return tubular boiler built with the ordinary form of butt joint, the author gave an example of the rupture of such a joint that would have resulted in an explosion. The joint recommended as a substitute for this, is one that has the inside and outside straps of the same width, but the outer row of rivets is made with a wide pitch and the straps are made sufficiently thick to stand calking between the widely pitched rivets.

Ordinarily the efficiency of this substitute joint is from 84 to 85 per cent, but it can be made as great as that of any other form of joint, if the pitch of the rivets is wide enough, in which case the straps would have to be thicker than would otherwise be necessary.

FRIDAY MORNING.

An interesting discussion on the relative efficiency of ball bearings as compared with roller bearings, followed the reading of a paper by Henry Hess, entitled "Line Shaft Efficiency, Mechanical and Economic." It was pointed out that the depreciation of only 10 per cent on ball bearings was probably unusually low. One speaker stated that he had conducted a series of more than 200 tests to ascertain line shaft efficiency and found that the unit, watts per bearing, was satisfactory for comparisons. Forty-three tests on a 1-inch shaft, operating at 400 revolutions per minute, gave a result of 27.1 watts per bearing; a 1½-inch shaft, operating at 300 to 400 revolutions per minute, 66.8 watts per bearing; a 2-inch shaft, operating at 190 to 250 revolutions per minute, 99.1 watts per bearing; a 2½-inch shaft, operating at 200 to

250 revolutions per minute, 108 watts per bearing.

In reply to a number of questions, Mr. Hess stated that the life of ball bearings is variable and depends entirely upon the conditions of service. He explained that ball bearings are universally applicable, whereas roller bearings can only be applied under certain conditions. While roller bearings cost less than ball bearings, nevertheless, if the maximum efficiency is desired, the ball bearings should be used. He added that until recent years much difficulty was experienced in securing balls made from the proper metal, that would withstand the service for which they were intended and in addition it is essential that the balls vary in size not more than 0.0001 inch. If there is a greater variation, the bearings will soon give way in service and the metal from which they are composed should be of uniform hardness. In reply to a question as to why the railroads have not adopted either ball bearings or roller bearings, it was stated that many tests have been made in this country with bearings of both types, but as the initial cost is very high as compared with the bearing now in use, the railroad managers have not seen fit to change, despite the increased efficiency, to say nothing of the lubricating difficulties which would be entirely overcome. A hot box has never been known where ball bearings have been used. In Germany, ball bearings are now being tested by several railroads and have already been in service for a distance of 600,000 miles, but no deterioration is noticeable as yet. Furthermore, it was found that a large saving could be effected in the coasting of trains by the use of ball bearings as compared with plain bearings. The latter showed a saving in power of 15 per cent as against 34 per cent for ball bearings. The Hess paper is given briefly herewith:

A complete test of the relative efficiency of a line shaft, 2 7/16 inches in diameter, operating at 214 revolutions per minute is described having a bearing load due to the weight of the parts plus the tension of the belts subjected to known stress by counter-weighting, when running in ring-oiling babbitted bearings and when mounted in ball bearings.

Sixteen tests, each of 40 minutes' duration, with belt tensions of 20 pounds to 90 pounds per inch width of single belt, were carried out. The instruments by which the electric energy consumed was measured, as well as all other instruments and the motor, were calibrated before and after the tests. The savings in power consequent on this change ranged from 14 to 65 per cent, with 36 and 35 per cent under average conditions of good practice, due to belt tensions of 44 pounds and 57 pounds per inch width of single belt, respectively.

The paper gives data for determining the power savings that may be expected in various plants, as a percentage of the plain bearing shaft friction and as a percentage of the total power consumption; also exact figures taking into account extra investment, depreciation, maintenance, interest on extra investment and power savings, which show that for the plant tested and described the savings represent 37 per cent per annum.

Valves and Valve Areas.

A. F. Nagle presented a paper on "Pump Valves and Valve Areas," of which the following is an abstract:

This paper is designed to call the attention of engineers to the need of reviewing the common notion that "valve-seat area" is synonymous with "velocity of flow." It is evidently the purpose of specifications for pumping engines to secure a low velocity of flow through the valves, thus reducing the head required to force water through the pump; but to accomplish this laudable purpose, special and intelligent attention should be given to the springs of the valves, rather than to valve-seat areas. If that be done, valve-seat areas need not be greater than the plunger area for the vertical triple-expansion pumping engines so largely used in city pumps. A slight economy in both construction and operation could be effected by giving more study to the proper design and strength of springs for pump valves

"The Bucyrus Locomotive Pile Driver" was the subject of a paper presented by Walter Ferris, which was published in THE IRON TRADE REVIEW, Nov. 18, 1909.

"A Report on Cast Iron Test Bars," by A. F. Nagle, was likewise published in full, in these columns, Nov. 25, 1909. In the discussion of this paper it was shown that the tensile strength of test bars is greatly increased by cleaning in tumbling mills.

Gas Power Section.

One of the sessions Thursday afternoon was under the auspices of the Gas Power Section, the interest in which was evidenced by an attendance of fully one hundred. The membership of this section has increased from 247 to 378, or about 50 per cent during the past year. Chairman F. R. Low outlined the progress recently made by this youthful organization and pointed out some directions in which its work might well be continued. Some 220 suggestions, he stated, had been received from members in reply to requests for specific problems to be investigated and he thought that after these were sifted down and duplications removed at least 120 would remain as a basis for actual work. He reviewed in detail the efforts of the various section committees including those on library, meetings and experimental work, these being supplemented in several cases by reports from their chairman. For the Installations committee, L. B. Lent reported that sufficient data had not yet been accumulated to justify placing it in permanent form but that the work would be carried on and a report would be available later. Prof. Fernald of the Case School of Applied Science later spoke of the data he has been compiling under direction of the government along this same line.

Two committees had made sufficient progress during the year to present reports in printed shape. That of the Standardization committee, which was emphasized as a preliminary report, included a number of practical recommendations regarding the use of terms and the method of making guarantees of performance for gas engines and producers, with the idea of putting a stop to the loose practices naturally resulting from the rapid progress of a new industry. The report of the Plant Operations committee presented a series of standard forms for use in connection with gas power plants. These were designed for use under all conditions, though a modification for blast furnace gas plants only was suggested by one member and incorporated in the report. Both these reports were the subject of some discussion on the floor.

Testing Gas Producers.

The first of two papers prepared for the session was entitled "Testing Suction Gas Producers With a Koerting Ejector" by C. M. Garland and A. P. Kratz, both of Urbana, Ill. This paper, which in their absence was presented by Prof. Goss, of the University of Illinois, is abstracted as follows:

The paper describes a method of testing the suction gas producer which is independent of the engine. The engine is blanked off from the producer and a Schutte & Koerting steam ejector is inserted, which draws the gases from the producer and delivers them to a scrubber in which the steam used by the ejector is condensed. The gases then pass to a Westinghouse meter where the volume is determined. A large part of the paper is devoted to the forms used in the computation and presentation of the results on gas producer tests. The results of one test are included in the article, together with a graphical log, illustrating the conditions during this test.

Bituminous Gas Producers.

A paper on "Bituminous Gas Producers," prepared by J. R. Bibbins, with special reference to testing on the double zone type, was outlined by the author, and is abstracted as follows:

This paper attempts to throw some light on the results of the development of a comparatively new type of apparatus, the double zone bituminous gas producer.

Much time and money has been spent by the various manufacturers in the development of a tar-free gas producer and in some respects the obstacles have seemed insuperable. Every advance is therefore of interest and importance and it has seemed worth while to report a long series of tests conducted by the builder to determine the net results under commercial conditions, whether good or bad. These tests are characterized by their unusual duration and absence of outside conditions affecting the results.

These results in general will speak for themselves and it is necessary simply to emphasize the fact that continuous operation has been secured with tar-free gas of reasonable heat value and producer efficiency and an over-all plant economy of about 1 pound of fair bituminous coal per brake horsepower (proportionate economies for poorer grades). More important still, the fact has been developed that the efficiency and general effectiveness of operation of the producer on low grade fuel, lignites, etc., is practically as high as with the higher grades. This places within the reach of the producer the enormous fuel deposits of the west and south, which are practically invaluable for steam work.

Among those to discuss the latter paper was Prof. Fernald, who spoke among other things of the several large units now in operation. Throughout the session the presentation of papers and reports was closely followed and discussion was generous. The poll of the ballots cast showed that J. R. Bibbins had been chosen chairman for the ensuing year and that the retiring chairman, T. R. Low, had been elected a member of the executive committee for five years.

Reception.

The reception by the membership of New York and vicinity to the officers and members of the society, their ladies and guests, was held at the Hotel Astor, Thursday evening. As usual it was a brilliant social affair, and was largely attended. The ladies' entertainment program was unusually complete, and included shopping tours, visits to the leading hotels, as well as several afternoon teas in the reception rooms of the Society.

THE STEEL TRADE

In the Philippines Compared with American Competitors.

The bureau of insular affairs of the War department has just made public some statistics on the trade between the United States and the Philippines, compared with the trade of the leading competitors of this country in those insular markets.

With respect to the general trade between this country and her distant island dependencies, it appears that during the past year the exports to the islands have decreased about $2,000,000 worth, and amount now to $30,000,000 worth. Philippine sales to the United States fell off about $3,000,000 worth, and amounted to $27,000,000 worth the past year.

Respecting sales of iron and steel products in the islands, it appears that the aggregate amounted to about $2,000,000 worth divided about equally between the United States on one side and Great Britain and Germany on the other, our sales to the islands being almost equal to the sales of the two other countries. The principal item in our exports of metals and metal products to the islands was sheet steel and plates, aggregating $159,000 worth; but Great Britain sent in $179,000 worth. In rods and tools, however, the United States easily ranks Great Britain. In structural material Germany far-distances Great Britain with $30,000 worth, but the United States sent $35,000 worth. The Philippines took about $200,000 worth of machinery from the United States, more than double the amount taken from the United Kingdom.

ELECTRIC STEEL-MAKING.

Indications Are 1910 Will Witness Many Installations in America.

The year just ending has been one of substantial progress in regard to the use of electric furnace by American steel-makers, but the indications are that 1910 will witness developments of far greater importance in this connection. Within the past year, the United States Steel Corporation has arranged for its initial electric furnace installations, both of the Heroult type, and that at South Chicago has been operated in an experimental way for some months. The Worcester installation will be started in the near future. A furnace of the Girod type is now being installed in connection with a steel plant in this country, the identity of which is not disclosed, and the American Iron & Steel Mfg. Co., according to latest advices, has not yet decided upon the type of furnace to be installed in connection with its billet mill at Lebanon, Pa.

As to the outlook for further installations, it is an unquestionable fact that interest in this subject was never before so general among progressive iron and steel makers of this country. One report has it that the Corporation may widen the scope of its experimental work by putting in one furnace of each of the types now on the market. The American representative of the various furnaces developed in Europe report a marked increase in inquiries and state that with several interests negotiations have progressed sufficiently far to render it practically certain that installations will be made. Naturally, in view of the relative unfamiliarity of American steelmakers with this process, these negotiations are conducted slowly, and definite decisions are anticipated only after the subject has been gone into most carefully.

IRON ORE DEPOSITS

The iron ores of the valleys of the Ottawa and Gatineau rivers have been the subject of an investigation by Mr. Fritz Cirkel, M. E., for the Mines Branch of the department of mines, and his report has just been published.

The publication of this report comes at a very opportune time, owing to the development lately assumed by the smelting of iron ores by electricity; for the region in question possesses great water powers, a part of which could very aptly be applied to the establishment of an iron and steel industry.

After describing in detail various iron ore deposits in the townships of Hull, Templeton, Wakefield, Bristol, Grenville and others, Mr. Cirkel concludes that many of these would yield ores which could in all probability be treated profitably in the electric furnace. It is stated in the report that this method of reducing the iron ores can compete with the blast furnace for the production of pig iron, when electrical energy can be developed at low cost.

It is expected that the Bethlehem Steel Co.'s furnace D, which is being replaced by a larger stack, will be in blast by Feb. 1. Work is going ahead on stacks F and G.

IRON TRADE CONDITIONS IN SAN FRANCISCO

HOW A GREAT CITY IS MEETING GRAVE PROBLEMS

Report of a Study Made by a Member of the Staff of THE IRON TRADE REVIEW—A Story of Wonderful Progress Since the Earthquake and Fire—Supremacy of the City Firmly Established

BY H. COLE ESTEP.

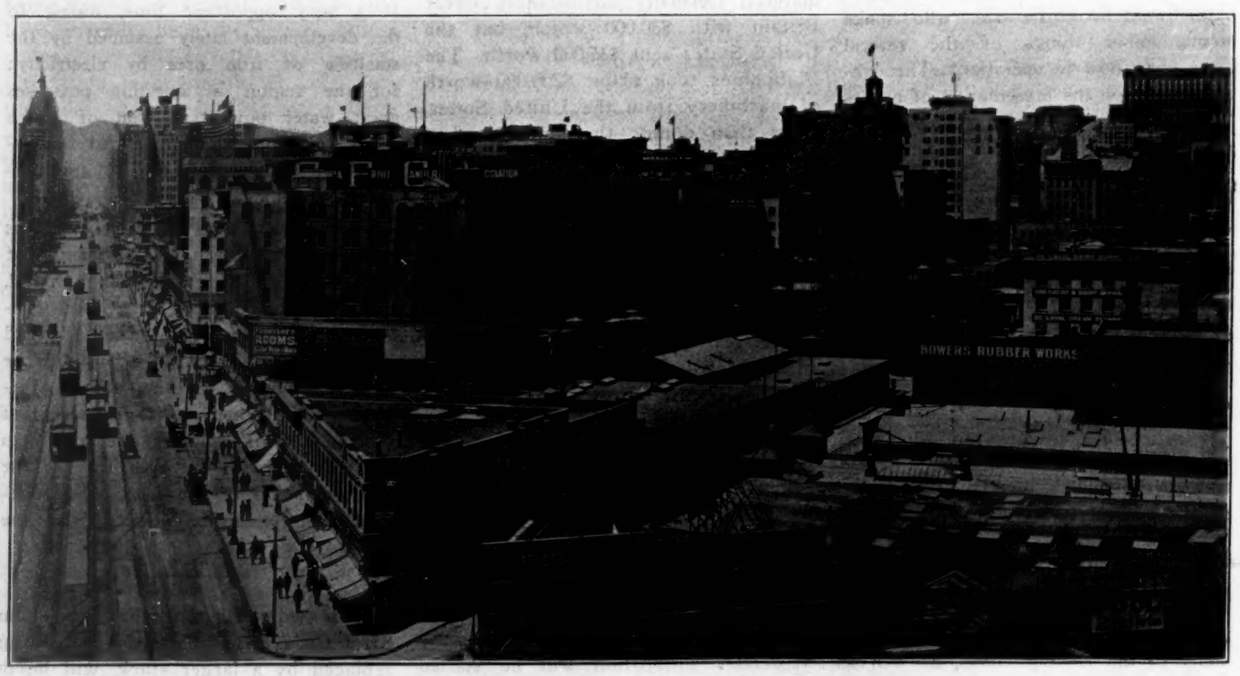
Owing to the fact that labor conditions in the iron trade in San Francisco are very interesting and unusual, THE IRON TRADE REVIEW sent a member of its staff to that city with instructions to make a thorough and impartial investigation. His report consists of the following article.

It will be remembered that the city of San Francisco sprang into existence as a result of the California gold excitement of 1849. Until the construction of the Union Pacific and Central Pacific railways connecting California with the eastern part of the United States in 1869, San Francisco was much more cut off from the rest of the country than Russia is today. Even for several years after the railroad was built, owing to the immense distance from eastern centers of supply and distribution, the city was comparatively isolated. This isolation produced a peculiar type of business man in which the characteristic American traits of progressiveness and independence were developed to an exceptional degree.

Men in which these characteristics predominated founded the iron industries, the foundries, machine shops, ship building plants, machinery manufacturing establishments, structural steel fabricating plants, and boiler shops of San Francisco. To protect their interests and make their business profitable, these men had to rely solely upon themselves. No one else could help them. They were practically cut off from the world. They had to face problems which are unknown in industries established in more settled communities. Coke and pig iron were—and still are—imported from Europe in uncertain sailing ships. The price of pig iron ascended as high as $45 a ton and coke to $25. Labor, very early a troublesome and vexatious problem, was extremely high in price, relatively inefficient and meager in quantity. These conditions developed a quality of self reliance in the iron industry of early San Francisco seldom found except in pioneer communities.

It is not to be wondered, therefore, that the men at the head of affairs achieved distinction. We are not surprised to learn that the first blast furnace built west of the Mississippi river was erected at Irondale, Wash., in 1870 by San Francisco enterprise and that this furnace was successfully used for a number of years to bolster the unsatisfactory and variable supply of pig iron available in the early days; nor is it illogical that the first commercial marine gasoline engines to be made in the world were produced in San Francisco, which was also the scene of the development of the tangential, high head, impulse waterwheel and many original designs in mining and saw mill machinery.

A few of the pioneers are still active in the affairs of the San Francisco iron industry and many of their sons have assumed positions of leadership. The most striking characteristics of the industry in the days of '49—a remarkable self reliance and courage—still prevail in 1909. To the existence of these characteristics may be traced practically



MARKET AND SACRAMENTO STREETS, SAN FRANCISCO, 1909.
PRACTICALLY ALL OF THE BUILDINGS EMBRACED ON THIS PHOTOGRAPH HAVE BEEN REBUILT SINCE APRIL, 1906.

all that is good and exceptional in the city's iron industry and also much that is weak and undesirable.

The Actual Situation.

Since the great fire and earthquake in April, 1906, a variety of reports have been circulated regarding the conditions prevailing in San Francisco. It is the purpose of this article to present a fair statement of the actual situation as it exists today, to set forth some details of the splendid work of reconstruction that has been accomplished since the earthquake, to discuss the very remarkable agreements made between union labor and the employers, to sketch the development of the California Metal Trades Association and discuss its policies and to summarize the general effect which these various factors will have on future conditions.

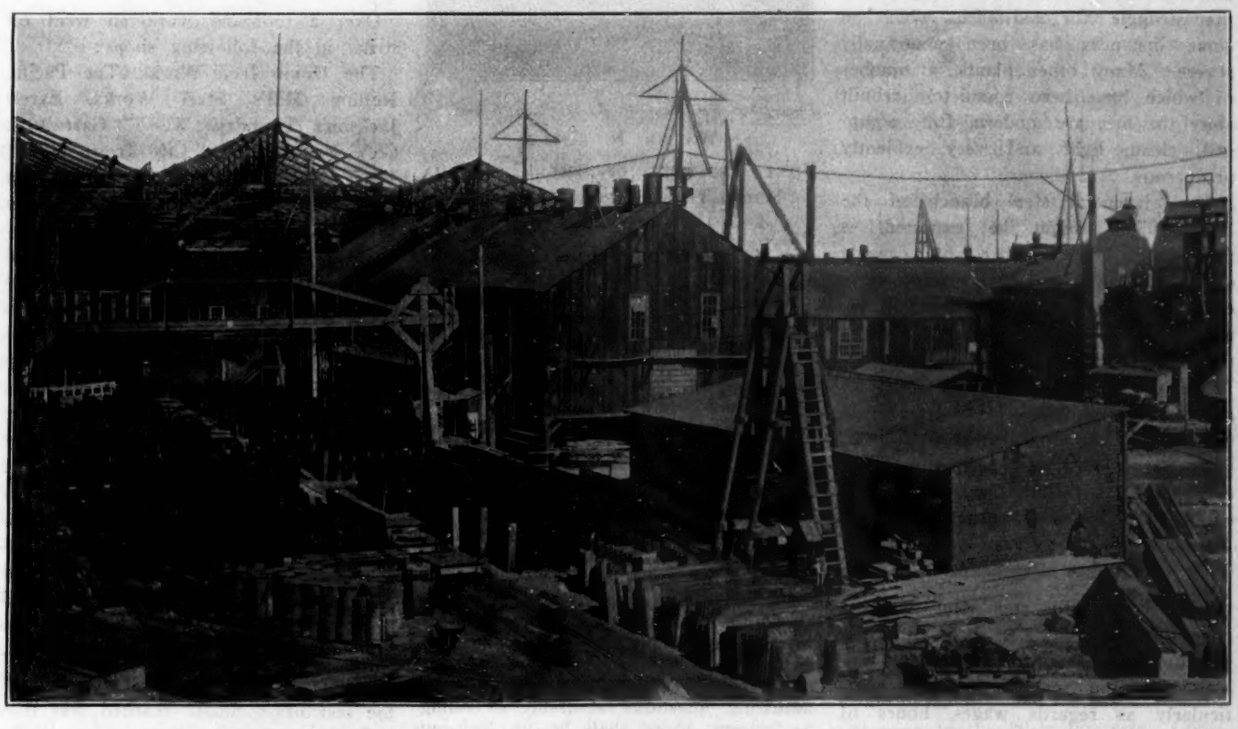
A population of approximately half a million people resides within the district which for lack of a better name may be called greater San Francisco. Seven million tons of freight pass annually through the Golden Gate. The bank clearings for 1908 amounted to $1,757,151,850; the real estate sales reached $31,083,571; the building permits aggregated $35,000,000 and savings bank deposits attained the sum of $146,131,886. These few figures go to show that San Francisco's claim to the position of pre-eminence among the cities of the Pacific coast is not unfounded.

In April, 1906, practically the entire city was destroyed by fire and earthquake. In the three years and a half that have passed since that date, $167,000,000 has been spent on reconstruction work. Over 90 per cent of this sum was furnished by the banks and local capitalists of the city.

Paralysis of Activity.

The immediate effect of the earthquake on the iron industry was almost total paralysis of activity in every direction, among the foundries, machine shops and jobbers alike. There were a very few shops that were not either wholly or partially destroyed by the fire. Not daunted, however, and strengthened by the wonderful spirit of self dependence already pointed out, the work of rebuilding shattered plants and impaired business began. The reconstruction has been vigorously pushed until today the physical equipment of the iron working establishments of San Francisco is equal and in some respects superior to what it was before the earthquake. To make this statement true a tremendous amount of work has been accomplished. Complete new plants have been built, many of them in Oakland, across the bay from their old locations; new warehouses have been erected and new stock of iron and steel bars, plates, shapes, structural material, nails, sheets, tubes, pipe, wire, etc. have been provided. Too much credit cannot be given to the leaders in the Bay City iron trade for the Herculean task which has been performed in the past three years. It is an achievement worthy of the greatest amount of unqualified praise. Its successful completion tried even the unusual resourcefulness of the business men of San Francisco. In our study of iron trade conditions we should constantly bear in mind the abnormal conditions with which San Francisco has been forced to contend and be correspondingly charitable. It is easy to criticize, for there are many conditions in the trade that are far from being ideal. We shall not hesitate to point out the weak spots as we see them, but always with the thought in mind that this weakness is not the result of inherent qualities but is rather the product of conditions enforced by a calamity unparalleled in modern times and that the tremendous progress made since the earthquake in merely restoring physical conditions is quite as much as the most exacting could expect in the time which has elapsed. Physically, the iron industries of San Francisco are completely rehabilitated.

There are 48 foundries in the city proper and 14 more in the adjacent suburban towns, making 62 all told in the territory embraced by San Francisco, Oakland, Alameda and Berkley. The San Francisco foundries have a daily capacity of 250 tons of castings, or an average capacity of 5.21 tons per day per shop. These foundries



PLANT OF THE UNION IRON WORKS CO., SAN FRANCISCO'S LARGEST IRON WORKING ESTABLISHMENT. THIS SHOWS A CORNER OF THE PLATE STORAGE YARDS WITH THE SHIP FITTING AND ERECTING SHOP IN THE REAR.

at present are operating at 64 per cent capacity, turning out 160 tons of castings per day. This activity is a considerable improvement over that prevailing 12 months ago and there is no reason to believe that business will not continue to increase during the ensuing year. Business conditions at present among the iron working establishments are very satisfactory as regards quantity of work available and prospects for increased activity in the future. Machinery prices are rising and prices for castings are somewhat more buoyant although they have not kept pace with the increased prices of raw materials. The price of castings for the last five years has shown only the slight variation of one-quarter to one-half a cent per pound, while the prices of the materials contributing to the cost of making castings have varied from 10 to 40 per cent. This anomalous situation regarding the price of castings is not peculiar to San Francisco alone but is general to a greater or lesser extent, throughout the Pacific coast. An effort is being made in San Francisco to make the price of castings conform more closely to governing conditions; the recently organized San Francisco Castings Co. is a step in this direction.

A number of the plants in the city, while large and amply equipped, possess an air of faded and run-down magnificence which points clearly to greater glories in days gone by. These plants bear most clearly the marks of the struggle for existence, which in some instances has been abnormally severe. Many other plants, a number of which have been completely rebuilt since the fire, are modern, fully equipped, clean, light and very evidently prosperous.

The structural steel branch of the business, as might be expected, is flourishing. A number of capable structural plants have been erected, some of which, notably that of Dyer Bros., are the peer in equipment to any of the best fabricating shops in the east. It is estimated that 98,000 tons of structural steel have been erected in San Francisco during the past year, fully 80 per cent of which was fabricated in local shops. Over 24,000 tons of the steel used was imported from Europe.

Labor Problems.

Viewed from the standpoint of those conditions necessary for successful competition, the situation still remains unsatisfactory in several directions, particularly as regards wages, hours of labor, limitation of output and kindred problems.

Reducing Hours of Labor.

In June, 1907, the following written agreement was made between the Iron Trades Council of San Francisco and the California Metal Trades Association, being signed on behalf of the council by Joseph F. Valentine and on the part of the association by James W. Kerr:

AGREEMENT made this first day of June, 1907, between the CALIFORNIA METAL TRADES ASSOCIATION on the one part, and the IRON TRADES COUNCIL of San Francisco, on the other part.

That considering the condition of San Francisco at the present time and the injury that would result to the city's interests from a continuation of the dispute in the iron trades, we mutually agree—

First, That all shops shall be opened and men return to work during the week of June 8, 1907, on the hours and pay prevailing April 30, 1907, the minimum wage rate per day of this

Photo by Vaughan & Keith, San Francisco.

WALTER N. KELLY,

FIRST PRESIDENT OF THE CALIFORNIA METAL TRADES ASSOCIATION, 1907.

date to prevail during the life of this agreement.

Second, That nine hours shall constitute a day's work until Dec. 1, 1908; from Dec. 1, 1908, until June 1, 1909, 8¾ hours shall constitute a day's work; from June 1, 1909, until Dec. 1, 1909, 8½ hours shall constitute a day's work; from Dec. 1, 1909, until June 1, 1910, 8¼ hours shall constitute a day's work; after June 1, 1910, 8 hours shall constitute a day's work.

Third, That there shall be no discrimination made by either side against any employe on account of connection with the present dispute.

Fourth, That a conference to discuss any other matters not provided for in this agreement may be called by either employers or employes in any craft, to provide for some method of adjusting questions at issue. Pending a decision, there shall be no lock-out on the part of employers or strike on the part of employes.

This document, on account of its recognition by the employers of the principles of the eight hour day and of mutual arbitration, has been raised from a position of merely local to that of national importance. For a full appreciation of the circumstances which led up to the agreement we must review the history of labor disputes in San Francisco from their inception in 1890 down to the present day.

The Strike of 1890.

The first strike began March 3, 1890, and concluded Nov. 1, 1891. The strike, while primarily instituted by the iron molders' union, involved also the coremakers, apprentices, and other crafts. Limitation of output was the chief bone of contention. The proprietors of a certain foundry in Potrero conceived the idea that if the daily output of each molder could be limited by the union, the various shops would be on a more equal competitive basis as regards labor costs. The idea met with favor among the men and the limitation of output was quietly introduced by the union throughout the city. The Engineers and Foundrymen's Association, an organization of employers, gave notice that on March 10, the union regulations regarding time of work and pay would be ignored.

The strike resulted. The following brief account of the events of the struggle indicates the bitterness with which labor disturbances in San Francisco are usually characterized:

Over a thousand workmen went on strike in the following shops:

The Union Iron Works, The Pacific Rolling Mill's Steel Works, Byron Jackson's Foundry, W. T. Garratt & Co.'s Foundry, The City Iron Works; Vulcan Iron Works, National Iron Works, Fulton Foundry, Risdon Iron Works, Architectural Iron Works, Industrial Iron Works, Golden State and Miner's Iron Works, Stelger & Kerr's Occidental Foundry. In rapid succession the apprentices struck and numerous unions voted the foundrymen assistance in preventing their members, carpenters, etc., from working in any striking shop. During the preliminary days of the struggle, the union men devoted all their energies to attempts at persuading non-union men from working in any of the above named foundries, but everything was orderly. The strike was endorsed on March 3 by the ironmolder's national convention.

The employers discussed settlement among themselves at great length and the conclusion finally reached was that if western firms were to successfully compete with the eastern ones, wages

would have to be reduced to the scale existing in the east ($2.50) and that the limitation of output would have to cease. The employers began the importation of non-union workmen from the east in the early summer and from then the violence began. On Aug. 2, Henry Seibert, a union man, was killed by Walter Rideout, a non-union man, in an altercation on a car. The coroner's jury decided it was done in self defense. On Aug. 4, another shooting affair occurred in a small riot at one of the foundries (National Foundry) and conflicting statements were made from all sides as to the cause of the shooting. During the summer, a striking molder, Edward Cogan, was also killed. The importation of non-union men kept up all summer, and with it the rioting. Some trouble was also caused for a time because the Vulcan Foundry, which is still running as a union shop, was accused of doing "struck" work for the non-union foundries in which the men had struck. The employers had the sympathy of the public largely because coast contracts for iron work were sent east regularly on account of the strike. Imported men were usually captured and sent back east before they reached the factories or deserted soon after arrival. The Potrero works of the Union Iron Works kept fulfilling several large contracts however with eastern labor. This sort of wrangling kept up for over 19 months, when finally, by action of the iron-molders' union, the strike was ended on Nov. 1, 1891.

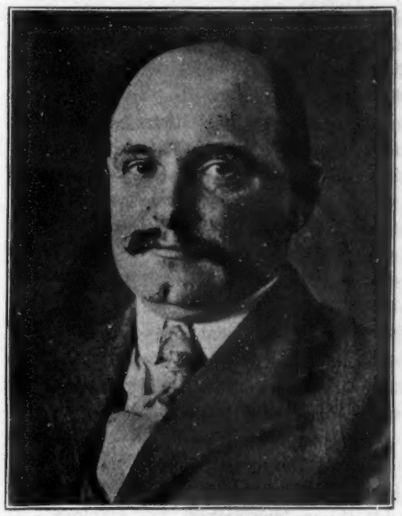
The employers would offer no terms to the strikers and the action of the union in declaring the strike off was gratuitous. Joseph Valentine, who during the strike had been elected vice president of the Iron Molders' National Union, returned from the East at this time and was the influential man for whom the union had been waiting before ending the strike. The core-makers likewise declared their sympathetic strike off. During the 20 months, several of the employers deserted from the Engineers' and Foundrymen's Association and finally only eight firms out of 14 were left in the association and only 80 men were among the strikers. The union was forced to yield unconditionally to the employers. The strike cost the union about $200,000, of which $50,000 was donated by the national union; the foundries lost immense amounts of business to the east which it took years to recover. Two men were shot and killed and several others were injured.

The Engineers' and Foundrymen's Association, which had been organized for the purpose of fighting the strike of 1890, was the first association of employers in the metal trades of San Francisco of which any record exists. The organization was formed under pressure for the particular purpose of breaking the strike. It had none of the qualifications necessary for a permanent existence and soon after peace had been declared was formally dissolved.

Short-Lived Organizations.

The following from an article by G. L. Bell indicates the character of the employers' association and the formation of the California Metal Trades Association in 1906:

"From time to time during the years 1891-1901 organizations of a character were formed, but were likewise very short-lived. Their usual purpose, similar to the Engineers' and Foundrymen's Association in organizing, was to combat labor to better advantage in some particular disputes. After the disputes were settled, the associations went out of existence. For example, in May, 1901, a strike occurred in the metal trades and just about the time of the declaration of the strike the employers formed an association, the Iron and Brass Foundries' Association, which seemingly was for no other purpose than to fight the workmen in the strike. The organization was even poorer among the employers than it had been in 1890, and as a consequence the employers were forced to yield to the demand of the men for a nine-hour day. The employers claim that they were in the right, but lost merely through disintegration."



E. J. Fowler,
Second President of the California Metal Trades Association, 1908.

It is significant to note that in this strike the employes of Steiger & Kerr's foundry remained at work. These men had an agreement with the firm to the effect that no general strike which had been declared would affect Steiger & Kerr's foundry unless a majority of the molders in this particular shop favored a strike. The majority voted to remain at work and the business of the firm proceeded without interruption. The success of this concern in its relations with its employes is due largely to the personality of James W. Kerr, one of the proprietors. Mr. Kerr has a keen appreciation of his men's point of view and a great sympathy for their problems. He has won the confidence of the men by upright and square although at times stern dealings and it is largely to his credit that the employers were saved from utter defeat in the 1907 strike for the eight hour day.

California Metal Trades Association.

In 1906 the California Metal Trades Association was organized. In May, 1907, the agitation for an eight hour day culminated in a strike by the iron molders and affiliated unions. The strike, which was "quiet and dignified", lasted only six weeks and was terminated by the agreement, quoted above, between the California Metal Trades Association and the Iron Trades Council. Recognition of the union and the immediate adoption of the eight hour day were demanded by the labor interests. By the terms of the agreement the union was recognized, but the complete attainment of the eight hour day was deferred for three years. The nine hour day prevailed for the first 18 months following the strike or until December, 1908, and then by four successive steps cutting off 15 mintues every six months, the eight hour day will be reached June 1, 1910. There is no change in the minimum wage, which is $4 per day for molders and $3.50 for machinists.

The employers of San Francisco and the California Metal Trades Association have been bitterly assailed for making this agreement. While undoubtedly the existence of circumstances making an agreement necessary indicates that a weakness existed on the part of the employers, in judging the act we must bear in mind the labor conditions which prevail in San Francisco.

The great fire and earthquake were a blessing to the labor interests. Compared with the capitalists, their losses

were trifling; their organization was as strong as it had been before the fire and their labor was in greater demand than ever. The employers were weakened and disorganized by the terrific blow they had sustained. Due advantage was taken of these conditions and San Francisco became the most strongly organized city in the United States. Organized labor obtained and still holds the upper hand. San Francisco is one of the few cities in the country—the only one of the first rank—in which the Union Labor party controls the municipal government. In spite of the malfeasance, graft and wholesale corruption of the Ruef-Schmitz regime, the city election of Nov. 2, 1909, showed clear majorities for most of the union labor candidates from the head of the ticket down. In face of these conditions, the employers in 1907 were but loosely organized and upon the demand for an eight hour day, half of the firms represented in the California Metal Trades Association immediately acceded to the demands of the union. With the employer's association impoverished by fire and earthquake, with half its members intimidated in the first round, with the labor forces so thoroughly organized that they were able to control the city government, resistance was useless. A compromise became a matter of necessity. Viewed in this light, the agreement formulated by Mr. Kerr appears to be a master stroke of diplomacy.

Some Good Results.

A number of good results have appeared from the agreement, which has been consistently lived up to by both parties. Chief among the benefits of the agreement is the opportunity it has given the employers to perfect their organization.

This work has been vigorously prosecuted and the California Metal Trades Association has grown and prospered until today it has attained a sphere of influence entitling it to a place among the prominent metal trades associations of the United States. According to a recent issue of the *News-Letter* of the association, it has 92 members at present.

There is no doubt that the eight hour day is working a great hardship on the iron industries of San Francisco and that it places the city at a disadvantage in competition with other points on the Pacific coast and with the east. As pointed out by Norris K. Davis in the October issue of the Monthly *News-Letter*, published by the California Metal Trades Association, the hourly rate of machinist's wages has increased 12.3 per cent over those prevailing before the strike but after the fire while the output has been reduced 11.1 per cent. In concluding his article, Mr. Davis says: "The aggregate increase in cost of production including wages due to the reduction of working hours and increasing hourly rate of pay may for quick calculation be assumed equal to the sum of the two percentages above, which is 23.4 per cent, and therefore, if 80 cents per hour be assumed as a fair average remuneration under conditions existing before the strike, then under conditions toward which we are working we should get 80 x 1.234 or 98½ cents per hour in order to preserve the same ratio of profit, and under conditions as they exist today 89¼ cents per hour. The sum and substance is that, if accurate shop cost is kept, it will show that at the present time some of us are actually paying for the privilege of doing work and that unless we get together and do something to alleviate this condition we shall all be paying for the privilege after June 1, 1910."

Coupled with this there is evidence that the old evil limitation of output has not been entirely eradicated. Instances of limitation crop out with sufficient frequency to indicate that this may be the next point on which the union will demand a definite agreement and further concessions by the employers.

Conditions in San Francisco are not as bad as they have been painted. The agreement made between the employers and the Iron Trades Council is not evidence of such lack of wisdom and nerve, as has been frequently alleged. All things considered, the employers in the iron trades of San Francisco have met their labor problems with eminent sense and have conducted their negotiations with a commendable respect for their own shortcomings.

The shorter work day and the limitation of output are unpleasant facts. A remedy must be sought out, and to one acquainted with the unusual resourcefulness of the San Francisco business men it is not doubted that a remedy will soon be forthcoming.

Will the Eight-Hour Day Extend?

In some quarters, the hope is held out that the eight hour day will spread north and south, embracing the whole Pacific coast and later reach out to the east, thus equalizing San Francisco's competitive position. Too much confidence had better not be placed in this expectation. As usual, it will probably be found that for the solution of their present problems the employers of San Francisco will have to look to themselves. It is through their organization—the California Metal Trades Association—that complete salvation will be found. Organization must be met with organization. At the present time, any attempts made to crush the unions in San Francisco must result in failure. Instead the employers must seek to strengthen their own organization until it has sufficient force to compel favorable terms and conciliation from the labor interests. Also, through the medium of the association, the general competitive conditions of the trade must be improved and measures taken to increase the shop efficiency to offset the decreased hours. Along these lines the unfavorable conditions prevailing in the San Francisco iron trade can be eliminated. It must not be understood that San Francisco, by the existence of these unfavorable conditions, is in any danger of losing her position of leadership in the iron industry of the Pacific coast. That position is too firmly established by natural advantages to be successfully or permanently assailed. The elimination of the unfavorable conditions surrounding the trade will, however, be the means of regaining lost business, will strengthen the situation generally and will eliminate the possibility of even temporary embarrassment.

The Metal Trades Association is working along the lines suggested above. Steps are being taken, not to agree to sell products at fixed prices, but "through intelligent co-operation and conciliation amongst competitors to influence such uniformity in rates as will insure a fair profit for all." Progress is being made both in the commercial department and in the direction of greater shop efficiency. It is the aim of the association to give a square deal to all, both to the men who do the work and to the employers who pay the bills. In the strict pursuance of this policy, the iron industries of San Francisco will prosper and the measure of this prosperity will be found in the strength or weakness of the Metal Trades Association.

A recent sale of 100 shares of stock at Youngstown, O., of the Youngstown Sheet & Tube Co. was made at $221 a share. Other sales have been made recently at $220, and some small lots have been sold at $225. The latest high sale was within $20 of the price paid one year ago in anticipation of a 50 per cent stock dividend.

AMONG MACHINERY MAKERS.

CLEVELAND

Further Behind on Orders Than Ever —Building Projects Started.

Office of THE IRON TRADE REVIEW, Browning Building, Dec. 14.

Business here and in the surrounding territory in all lines of manufacturing is satisfactory. The majority of shops are working overtime and many have put on all night shifts. Labor conditions are unusually satisfactory in general, there being only one case of importance, that of the Loew Mfg. Co., where there is any notable disturbance of this sort, and in this case the company is not being particularly hampered in its work. In general, shop wages have been increased from 10 to 15 per cent during the past six months.

Manufacturers of machine tools have all the work that they can handle, and in general the only statement that might be made comparing the situation as it is at present, with that of a week or two weeks ago is "further behind on orders than ever."

The Bowler Foundry Co. advises that its business during the past few weeks has been about normal, and it does not look for rush during the present month, as most of the larger concerns are holding off buying on account of taking inventory Jan. 1.

The Burke Machinery Co. advises regarding a recent increase in capital stock that this is for the purpose of erecting a new plant at Columbus, O., into which the company will move within a few days. While this concern anticipates putting in very little new machinery, its output will be doubled, and some tools added to its present line.

To provide for the addition of new machinery and general extension of its business, the Fanner Mfg. Co. has increased its capital stock from $400,000 to $1,000,000. This concern makes stove trimmings and novelties, and its plant is running to its fullest capacity, the company having recently instituted a night shift. With the new machinery to be added, 200 additional men will be employed, bringing the total to 800. Officers of the company state that its business is growing rapidly, and that the company has difficulty in finding sufficient help to keep up with its orders.

The Standard Brass Foundry Co. will erect a new building within a short time, and it will be a one-story brick structure, 60 x 113 feet in size.

Contracts for over 1,200 additional horsepower to its plant for power purposes are being placed by the Coshocton Light, Heat & Power Co., Coshocton, O. This concern will also begin work on a hydroelectric plant of over 1,000 initial horsepower in the spring, water power being obtained from the state dam in the Walhonging river.

Work will be begun at once on the erection of a new car house by the People's Railway Co., Dayton, O. The dimensions of the new building will be 250 x 180 feet, and its cost is estimated at $125,000.

The Warner Mfg. Co., Toledo, has been organized to manufacture automobile gears and transmission. T. W. Warner is president, E. S. Janney, secretary and treasurer, and Charles S. McCarthy, superintendent. The new concern is located in the old Pope-Toledo plant.

The Foos Gas Engine Co., Springfield, O., is working its plant to full capacity, with two shifts of men, and is still falling behind on orders. Among recent orders received by this concern was one for six 150-horsepower, two-cylinder vertical Foos engines, from the Hazel-Atlas Glass Co., Wheeling, W. Va.

The business of the Kelly Tool Co. has been taken over by the Kelly Reamer Co., 5406 Bridge avenue, Cleveland. It will manufacture the Kelly reamer and other tools and devices. The concern is incorporated with $25,000 capital stock, with the following organization: William E. Kelly, president and general manager; Albert H. Weed, vice president; and William R. Miller, secretary and treasurer. A new factory has been built by this concern on Michigan avenue.

NEW YORK.

Important Meeting of Lathe Manufacturers With View to Standardization.

Office of THE IRON TRADE REVIEW, Room 1005, No. 90 West St., Dec. 14.

This city during the past week has witnessed a gathering of machine tool manufacturers second only to that occasioned by the annual meeting of the National Machine Tool Builders' Association each October. Of these a good many were attracted by the sessions of the American Society of Mechanical Engineers, the meeting of which was attended by perhaps more than the usual number of machinery and equipment builders. Manufacturers of lathes, however, came to the city with a more definite purpose, and in a meeting at the Hotel Astor took up the much-discussed problem of standardizing their product. Practically every lathe builder of importance in the trade was represented and, while the meeting was naturally of an executive character, it is learned that the purpose of the gathering was accomplished to a very satisfactory degree and that the types of lathes put out by various makers hereafter will adhere much more closely to standard measurements. Incidentally resulting from this action, a readjustment in price will be made, effective Jan. 1. This does not necessarily mean a general advance, although apparently justified by the brisk demand for this class of machine tools generally reported, but was rendered inevitable by the changes resulting in the designs of certain makers, as for instance where a lathe sold as a 16-inch was practically an 18-inch, this being typical of one of the conditions which the conference sought to correct.

Conversation with both manufacturing and selling interests develops the information that the machine tool trade continues its improvement. In those lines affected by the automobile industry particularly, deliveries continue to grow more remote and for certain desirable makes of tools recourse is being had to dealers' stocks for early shipments. Although there is still an absence of railroad or other large lists of tools before the trade, the demand from miscellaneous sources is so good that December so far has proved one of the best of the fall months. Considerable crane inquiry is noted in the east.

The trade is anticipating an early decision on a rather important list of tools on which bids were recently taken by the International Steam Pump Co., evidencing the heavy expenditures by this interest in connection with improving the equipment and providing material extensions at several of its plants.

Much interest is being taken in the recommendation contained in the

President's message that a repair ship be provided for the navy, although it is understood that many months must elapse before the equipment trade would be called upon in this connection. Such a vessel would probably involve a total expenditure of $3,000,000 and the machine tool requirements would be large and of an unusually high class.

Another governmental project of particular interest is the gyratory rock crusher on which bids have just been opened by the Isthmian Canal Commission. This is to have a hopper 20 feet in diameter and is really a sledging machine intended to displace the use of dynamite as a first stage breaker to reduce the rock to a size within the capacity of the ordinary crushing machinery. It will be the largest machine of its kind ever constructed and only two or three interests in this country are in shape to undertake its building.

Among the improvements contemplated by the Virginia Railway & Power Co., Richmond, Va., which expects to spend over $500,000 in bettering its plant and equipment, are two repair shops, one of considerable size.

The Millard Construction Co., Philadelphia, submitted the lowest bid, $3,269,280, for the construction of the Hill View reservoir and portions of the Yonkers and Van Cortlandt syphons in the Catskill aqueduct system.

CINCINNATI.

Demand for Heavy Machine Tools Shows Tendency Toward Improvement.

Office of THE IRON TRADE REVIEW, First National Bank Bldg., Dec. 14.

Inquiry and demand for machinery and machine tools continues to be maintained in sufficient volume to encourage manufacturers to continue operations to full capacity. The past week has not been particularly notable in the development of features connected with the business, but the outlook for next year is generally regarded with satisfaction by the manufacturers of machine tools in this center. There is a continued tendency toward the broadening in demand and the recent indications of an improvement in the east have been a source of satisfaction and added encouragement.

The foundry trade continues good and some large contracts have been placed with local foundries during the week for castings to be used outside of the machine tool and machinery interests.

The labor situation shows no improvement and there is a constant demand for suitable machinists for the shops, and all applicants for positions applying to the employment bureau at the local Metal Trades Association are given a choice of several shops where their services are in demand.

The matter of deliveries is still perplexing to the manufacturer as a number of the shops are so well sold ahead that they are not in a position to make early deliveries even on standard sizes and specifications.

There is a tendency toward improvement in the demand for the heavier types of machines and while the manufacturers in these lines are not as a rule behind on orders there is enough business coming in to keep the shops running comfortably.

The new iron foundry of the Lunkenheimer Co. is expected to be ready for work in the early months of the new year.

The John B. Morris Foundry Co. has secured during the week some large foundry contracts and has also booked some orders for machine tools, so that the plant is busy in all departments.

The Willard Machine Tool Co., which recently moved into its new plant in Covington, expects to ship the first lot of its new lathes about the first of the year.

The Cincinnati Pulley Machinery Co. reports business as excellent and its recently increased facilities are kept busily engaged on orders. The call for light sensitive drills is especially good.

BUFFALO.

Engine Builders Find Situation Abnormal.

Office of THE IRON TRADE REVIEW, 932 Ellicott Square, Dec. 14.

No perceptible change has occurred in the general machinery situation, but new business is coming out fully as liberally as it was several weeks ago. The numerous electric railroad projects in New York state are of interest to the machinery manufacturers making this grade of equipment. The call for steel rails from this field is also notable. Special machinery shops are crowded fully as much as they have been with no sign of a let-up. Engine builders find good inquiry. Builders of small motors for automobiles and trucks are rushed. This situation is abnormal. Marine engine makers find the tone of inquiries better. They look for a busy period. Most of the makers report booking good business.

E. H. Symington, formerly manager of western sales of the T. H. Symington & Co., of Baltimore, Md., with headquarters at Chicago, and who has been absent from duty for the past three years, owing to an injury, has fully recovered and has been stationed at Rochester as works sales manager. T. H. Symington & Co. are constructing an extensive malleable plant at Rochester.

It is probable that the Binghamton Railway Co. will soon be in the market for equipmment for an extension from Sayre, Pa., to Towanda, N. Y.

Ralph D. Gillett, president of the Buffalo, Rochester & Eastern railroad, set forth several interesting statements before the State Public Service Commission concerning the company's plans, among them being the statement that the company is ready to spend $85,000,000 for the construction and equipment of a steam railroad from Buffalo to Albany or crossing New York state from east to west, and further that work could be started immediately. There are now five steam railroads crossing the state and one electric line almost complete.

The Buffalo Co-operative Stove Works, will build a two-story factory at Amherst and Tonawanda streets to cost $9,000. It will be a modern plant in every detail.

An important contract has been let by the Albany Southern railroad calling for the double-tracking of the line from Rensselaer to Kinderhook Lake, N. Y., besides numerous improvements to the company's property. J. G. White & Co., of New York, were awarded the contract.

Ice Making Plants.—Two contracts for complete ice making and refrigerating plants have recently been awarded the Harris Ice & Machine Works, Portland, Ore. Both plants are located in Boise, Idaho. One, which is being erected by a company recently organized, will have a daily capacity of 20 tons and will cost, when completed, about $60,000. The other plant is for the Shubert Hotel Co., now constructing one of the largest hotels in the state of Idaho.

Phelps, Dodge & Co. has declared a dividend of 2 per cent in addition to its regular quarterly dividend of 2½ per cent. The dividend is payable Dec. 31. The total dividend for the year is now 12 per cent.

ERECTING PROBLEM

On Temple Dome—Auto Builders Plan for Next Year.

Indianapolis, Ind., Dec. 13.

The roof being erected on Murat Temple in this city is causing much attention on the part of contractors and structural erectors. It is to be of the steel truss type and self-supporting. In the roof structure is being used ten steel beams of a joint length of 112 feet. Each of these joint beams is in five sections. Much difficulty has been encountered in erecting them, owing to the unusual weight, but the work is now nearing successful completion. All of the steel work is being supplied by the Brown-Ketcham Iron Works of this city. Albert Von Spreckleson is the general contractor and is erecting the steel work.

It is reported that the Fort Wayne Rolling Mill Co. is now operating its plant to the fullest capacity. For several months the company has had an excellent business and has enough orders ahead to keep the plant busy for some time.

Andrew T. Foster, Forrest G. Hurst and Thomas Sheehan have organized the Foster Switch Co., at Fillmore, and the company has been incorporated with an authorized capitalization of $9,000. Switches and switch blocks will be manufactured.

There is much agitation in Anderson over the question of erecting a municipal heating plant, and it is probable that steps along this line will be taken next year. It is proposed that the plant shall supply heat not only to all municipal buildings, but to business blocks and private residences.

Local manufacturers of automobiles state they will manufacture 20,100 automobiles during the coming season, as follows: American Motor Car Co., 300; Cole Motor Car Co., 1,000; Empire Motor Car Co., 1,000; Overland Automobile Co., 8,000; Marion Motor Car Co., 1,000; Premier Motor Mfg. Co., 800; National Motor Vehicle Co., 600; Nordyke & Marmon Co., 500; Star Motor Car Co., 1,000, and The Waverly Co., 900.

FOOL PROOF STEEL CARS.

The Pittsburg Railways Co. is having built by the J. G. Brill Co., of Philadelphia, 80 steel traction cars for city service and 20 interurban cars. The steel traction car is 46 feet 8 inches long, seats 57 people, weighs 44,000 pounds, has steel wheels, Brill trucks, Westinghouse motors, two of 100 horsepower being on each car, and Westinghouse airbrakes. The car bodies are of steel to the window sills. The interior is finished in cherry, cross seats of rattan are placed on the right side and longitudinal seats on the left side, and the windows are large and wide to give the greatest amount of light. The cars are equipped with 25 incandescent lamps. The pay-at-entrance style of fare collection will be used and the main exit will be from the front end of the car. The car has no front platform. There are no doors between the rear platform and the car body, but there are a pair of entrance and a pair of exit doors over the rear step with grab handles attached to each door. These doors, when closed, entirely cover the rear step and the grab handles are within the car, rendering it impossible for persons to endanger their lives by attempting to board cars after they are in motion.

AMERICAN CROP END IMPORTS CLEAN UP ENGLISH STOCK.

That the recent heavy importation of crop ends from England, received at the port of Philadelphia, has used up the supply on hand of crop ends, is thus made plain in the following from The Ironmonger, of London:

The clearances of Cleveland pig iron from the Tees so far this month are very poor, the foreign returns being only about half the October total, while the Scotch takings are heavily reduced. In spite of this, however, and of the continual increase in stocks, prices in the warrant market have ruled firm, though trading has been very dull. The supplies of warrants are under pretty close control, it would appear, and there is always a chance of America shipping the iron represented by some of the documents held for that account. United States demands are still practically non-existent, but further chartering is in progress. New fixtures are the St. Gothard, Tees to Philadelphia, with pig iron; the Rhodesia, Tees to Baltimore and Philadelphia, with ferro and foundry iron; and the Patria, Antwerp to Philadelphia, with 4,000 tons of crop ends. The market seems to have been swept bare of prompt crop ends in first hands, though no doubt there are dealers who have material available to meet pressing needs. The general tone of the pig iron trade in the Midlands is spiritless and the tendency of prices is downwards, while buyers act with continued and increasing reserve. There is no sign of returning activity in finished iron and steel, where, although prices remain much about the same as of late, there is only the most meagre buying in progress. Continental semi-finished steel is firm, and works are by no means anxious sellers for forward delivery, for as a rule they believe that trade during the spring months will broaden out considerably.

OPPOSE CORPORATION TAX.

Philadelphia Foundrymen Vote It Unjust and Discriminating—Officers Nominated.

At the regular monthly meeting of the Philadelphia Foundrymen's Association, held at the Manufacturers' Club on the evening of Dec. 1, an interesting paper on "The Handling of Freight by Electrical Machinery," with lantern slide illustrations, was presented by H. McL. Harding, of the International Lecture Institute, New York City. This was a general summary of what has been accomplished in this country and abroad along the lines of economical freight handling, particularly by cranes and transferers.

The association went on record in no uncertain terms, as condemning Section 38 at the new tariff measure, which provides for the taxation of corporations, as unjust in principle and discriminating in character, imposing upon manufacturers and mercantile corporations a burden not borne by individual or partnership enterprises, and admitting of such easy evasion as to render its enforcement in an equitable manner quite impossible. Strong resolutions along these lines were adopted.

The nomination of officers for the ensuing year, to be voted upon at the January meeting, included few changes from those of the year just ending. Thomas Devlin, of the Thomas Devlin Mfg. Co., was renominated for president; E. E. Brown, of E. E. Brown & Co., was nominated for vice president to succeed Alexander E. Outerbridge Jr.; and Josiah Thompson, of J. Thompson & Co., and Howard Evans, of J. W. Paxson Co., were re-nominated for treasurer and secretary, respectively. George C. Davis was continued as official chemist and the following executive committee was named: Walter Wood, of R. D. Wood & Co.; Thomas M. Eynon, of the Eynon-Evans Mfg. Co.; H. L. Haldeman, of the Pulaski Iron Co.; Walter N. MacDonald; and S. S. Knight. Thomas Devlin, Howard Evans and Josiah Thompson were continued as trustees.

The order for 6,000 tons of 80-pound steel rails for the Federated Malay States, with 500 tons of fishplates, has been taken by Bolckow, Vaughan & Co. There is still pending in the European market a 26,000-ton inquiry from Denmark, but otherwise the situation is extremely quiet.

NEW PROCESS

For Reducing Titanium Ores Will Be Used by Washington Company.

For the purpose of manufacturing steel by a new process, using titanium black sand ores which exist in abundance on the Pacific coast, a company has been incorporated in the state of Washington under the name of the Washington Steel & Iron Co. The general offices and plant are to be located at Spokane, Wash. The company has incorporated for $1,000,000 with the following officers: M. A. Corner, president; O. P. Moore, secretary and treasurer; E. H. Rothert, general manager.

The Washington Steel & Iron Co. expects to use a process for the reduction of titanium ores which has been invented by Mr. Rothert, who has been experimenting for a number of years at Hoquiam, Wash. The ores are treated either in a crucible or in a small open-hearth and the secret of the process lies in the introduction of certain fluxes into the bath, the nature of which is not made public. The process is not feasible for the production of ordinary pig iron or mild steel in commercial quantities. Only high grade tool steel will be manufactured at the Spokane plant.

"I do not claim that I shall be able to revolutionize the steel industry," Mr. Rothert said in his office in the Columbia building, Spokane, "but I have discovered a process by which we can utilize this ore in a commercial way."

NEW SYMINGTON FOUNDRY AT ROCHESTER OPERATING.

The new works of T. H. Symington Co., at Lincoln Park, Rochester, N. Y., was placed in active operation a few days ago, having been under construction since last spring. Although it will be some months before the plant will run to capacity, it is estimated that the foundry will have a daily capacity of about 100 tons of castings, largely in the line of railway equipment specialties. The main foundry building is 456 feet long by 422 feet wide, steel, brick and concrete construction. In the pattern and machine shop, which is 42 x 128 feet, it is proposed not only to repair machinery used in the plant's equipment as required, but to manufacture such special machinery as is needed in the operation of the plant.

Although the main offices of the company will continue at Baltimore, manufacturing will be carried on almost entirely in Rochester. As soon as the Lincoln Park structure is completed, the company's old plant at Corning, N. Y., will be abandoned.

FOUND NOT GUILTY IN BOSTON COLLUSIVE BID CASES.

Thirty-three steel firms and individual agents for steel material companies were declared not guilty of collusive bidding on municipal steel contracts Dec. 8 in the superior court at Boston. The trial had lasted eleven weeks. Sixteen of the defendants were acquitted by order of the court, the others being found not guilty by a jury.

The fifteen defendant corporations and individuals were the New England Structural Co., Eastern Bridge & Structural Co., G. W. & F. Smith Iron Co., Phoenix Iron Co., Canton Bridge Co., Boston Bridge Works, Inc., Harry O. Russ, Harry C. Collins, Charles M. Pennyquick, Elmer F. Smith, Frank E. White, George C. Bartram, John H. Britton, Benjamin K. Gorham and A. S. Miller Jr.

BENSON MINE IMPROVEMENTS.

One of the two nodulizing kilns at the Benson Mines workings, with a capacity of 100 tons per day each, has begun operations and a remarkably good product is being secured. The nodulizing plant was intended to operate on the fines from the concentrating plant. As soon as the second kiln is running, the daily output of the workings will be about 200 tons of crude ore and concentrates and 200 tons of nodulized ore. Shipments are being made as far west as Ohio plants and to several furnaces in the eastern Pennsylvania district. The property is operated by Pilling & Crane.

Dr. Eugene Haanel, Canadian director of mines, has been advised of the erection in Norway of a second electric iron-smelting plant by H. Boholm, director of the Cobber Mine & Smelter Co., of Trondhjem, who has requested Dr. Haanel to recommend to him an electro-metallurgist capable of taking charge of the construction and management of the plant.

The Canadian Westinghouse Co. of Hamilton, Ont., has secured a contract for electrical apparatus for the power system of London, Ont., amounting to $51,908.

The Union Iron Works, Ltd., Toronto, has been incorporated with a capital of $200,000.

SATISFACTORY OUTPUT

Of Rails Reported Made by Monterey Iron & Steel Co.

Monterey, Mex., Dec. 9.

The Monterey Iron & Steel Co. is now working full capacity, chiefly on a large order for rails for the National Railway. A very satisfactory product is being turned out according to statements of the railroad officials. Ore from the Cerro Mescado deposit at Durango is being shipped to the Monterey plant for mixing. The damage to the plant from the floods of last September has been repaired.

A company with $5,000,000 capital stock composed mostly of Boston and New England investors, has been formed to operate the Tula Iron Works in Jolisco. This is a charcoal plant which has been operating in a small way for many years. It was for a time leased to an American company, which did not renew the lease. The property is off the railroad in a mountainous locality, south of Guadalajara. It is thought that the formation of a company with such a large capital savors of a stock market deal as the business is limited by physical conditions.

Business conditions in Mexico are improving and the political situation is calmer. However, the country will have to face another season of poor crops, due to unseasonable frosts, and the mining industry, owing to low silver and copper prices, is not yet up to the pace of two years ago.

RAILROAD TRAFFIC INCREASES.

The traffic movement of the railroads for October, as measured by the number of freight cars handled by 33 car service associations and demurrage bureaus, 3,244,155 cars, continues to show gains over the figures of the earlier months of the year, as well as the corresponding 1907 totals. The number of cars handled by these associations during the 10 months of the present year, 25,704,721 cars, was 13 per cent larger than the corresponding number in 1908 and even in excess of the corresponding number two years ago.—*Bulletin of Department of Commerce.*

While no official statement is made, it is understood that the Alabama City stack of the Southern Iron & Steel Co. may be blown in Dec. 15.

Clifton No. 2 stack, of the Alabama Consolidated Coal & Iron Co., was blown out temporarily Nov. 23.

NOTES ON THE STRUCTURE OF A VERY PURE IRON-CARBON ALLOY

By Albert Sauveur.†

The photomicrographs reproduced in this article refer to the structure of a pure iron-carbon alloy obtained by melting some electrolytic iron with sugar charcoal in a graphite crucible brasqued with magnesia. The electrolytic iron was free from carbon, silicon and manganese; it contained a trace of sulphur and 0.015 per cent of phosphorus. The charcoal used was practically pure carbon, while the lining of the crucible with a coating of pure magnesia, one inch thick, precluded the absorption of any silicon by the iron. The resulting metal was a nearly chemically pure alloy of carbon and iron. Upon solidification, therefore, the distribution of the carbon between the graphite and combined varieties could take place with complete freedom from the well known influence of silicon. That distribution became solely dependent upon the rate of cooling and the pressure.

It was attempted in this melt to introduce 3 per cent of carbon into the alloy. The melting was performed in a crucible furnace made by the American Gas Furnace Co. After a temperature of some 1,600 degrees Cent. had been obtained, the gas and blast were shut off and the crucible and its contents allowed to cool very slowly with the furnace.

The button of cast iron obtained weighed about 300 grams. It was sawed in two vertically through the middle. Upon polishing one of the surfaces the metal was found to consist of a core of white cast iron surrounded by a shell of gray iron (see Fig. 1). The very sharp line of demarcation between the white and gray portions should be noted. In Fig. 2 is shown, under a magnification of 250 diameters, the structure of part of the white and part of the gray portions. The change of structure is abrupt. The white core was found to contain 2.14 per cent total carbon and to be quite, if not altogether, free from graphitic carbon. The structure of this white core is shown in Fig. 3, magnified 100 diameters, and in Fig. 4 magnified 300 diameters.

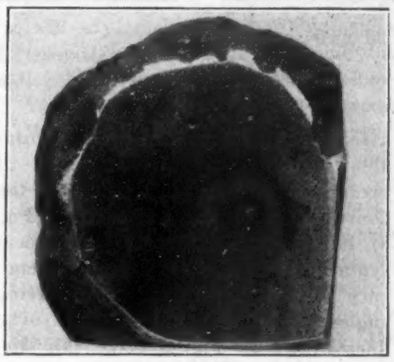


Fig. 1—Vertical Section Through the Middle of a Button of an Iron-Carbon Alloy Containing About 3 Per Cent of Carbon and Free From Silicon. Core of White Cast Iron Surrounded by Gray Cast Iron. Slightly Magnified.

Two well known factors of opposing tendencies were at work during the solidification of this pure iron-carbon alloy; first, the complete absence of silicon which would tend to oppose the formation of graphite carbon, and second, the very slow cooling which would tend to produce graphite. It is seen that the second influence prevailed in a considerable portion of the iron and that an abundance of graphitic carbon was formed in spite of the total absence of silicon. Since the central portion of the metallic mass was necessarily cooled more slowly than the external portion, we would at first naturally expect to find more graphite, if anything, in the central portion. Instead of this expectation being realized, the metal was a solid core of white cast iron of considerable dimension and practically free from graphite. It is evident, therefore, that in this portion another influence was at work which prevented the formation of graphitic carbon. Pressure seems to be the influence responsible for the formation of the white core. A word of explanation will make the matter clear. When molten cast iron solidifies, the solidification is accompanied by a marked expansion, and this expansion is in all probability due to the formation of graphite carbon in the graphitic state occupying more space than when in solution in the iron. The graphite formation period, therefore, of the cooling of cast iron, is a period of expansion. Any pressure exerted and tending to oppose this expansion must necessarily check the formation of graphite, and if it be powerful

†Professor of Metallurgy in Harvard University.

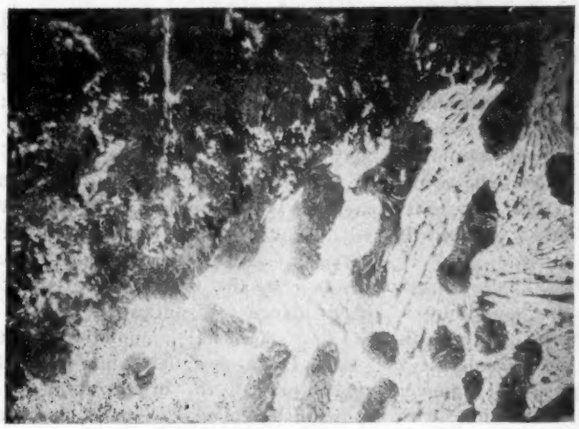


Fig. 2—Boundary Line Between White Core and Gray Shell. Magnified 250 Diameters.

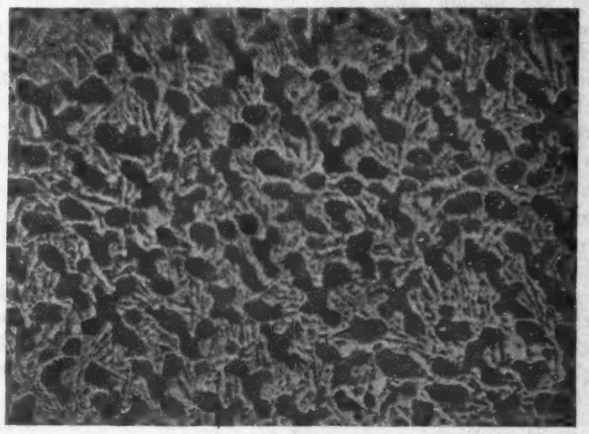


Fig. 3—White Cast Iron Core. Magnified 100 Diameters.

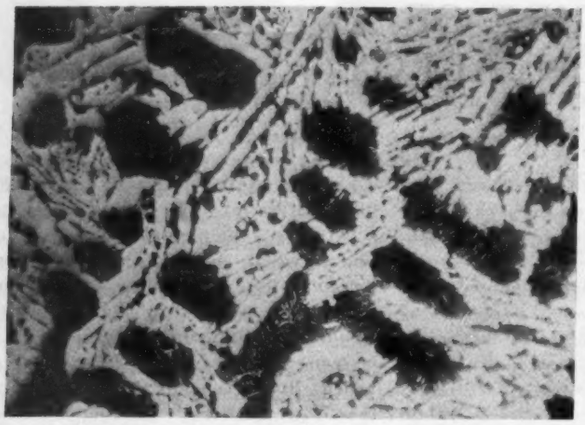


FIG. 4—WHITE CAST IRON CORE. MAGNIFIED 300 DIAMETERS.

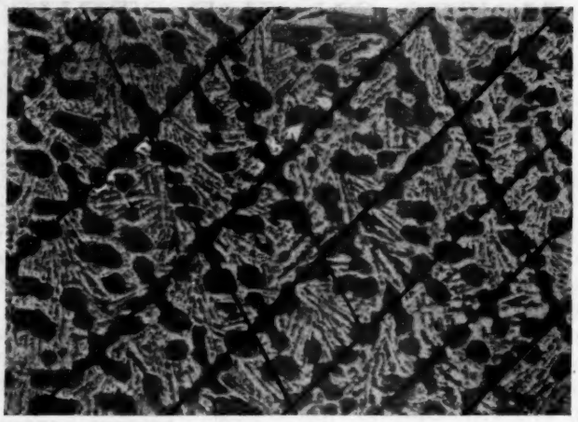


FIG. 5—WHITE CAST IRON CORE. MAGNIFIED 100 DIAMETERS. BLACK LINES DRAWN TO SHOW PARALLELOGRAM FORMATION.

enough, prevent it altogether. This is apparently what happened during the solidification of our alloy. When the central core began to solidify it was subjected to so powerful a pressure by the now rigid and contracting gray shell surrounding it that the formation of graphitic carbon was prevented. Had enough silicon been present, graphite would undoubtedly have formed in spite of the pressure. This is why gray cast iron, always rich in silicon, never exhibits this core of white cast iron. The influence of slow cooling and of silicon combined is powerful enough to produce graphite in spite of external pressure but slow cooling alone, unassisted by silicon, is apparently unable to overcome the influence of pressure. The arrangement of the constituents of the white core (Fig. 3) is remarkable for its geometrical symmetry. It exhibits a marked tendency to form parallelograms having angles of 60 and 120 degrees. The lines drawn in Fig. 5 make this disposition more apparent.

The brasquing of the crucibles, the melts, the preparation of samples for microscopical examination and their photography were conducted by L. Dwight Granger, at the time a graduate student in Harvard University, now connected with the American Steel & Wire Co., Worcester, Mass.

SOME NOTES ON COAL AND ASHES HANDLING EQUIPMENT*

BY DAVID GAEHR.†

While considerable thought and engineering ability have been expended on the design and construction of machinery to handle coal and ashes in power plants, it is quite evident to the careful observer that this class of machinery has not as yet received the recognition it deserves as a paying investment.

Although there are many record-breaking installations of this nature now in service, these are generally found in modern plants of very recent construction, since manufacturers usually are extremely reluctant about making any changes in old plants. If they give the question of coal and ash handling machinery any attention at all, they can see little beyond what appears to them an unwarranted and unnecessary expense, and often they refuse to be enlightened. This is especially true in smaller plants, the managers of which usually consider labor saving machinery of this type to be of no use except to foster laziness in employes who previously have done the work by hard manual labor, and who must be retained, even if such equipment is installed.

Consulting engineers, however, are awake to the economic possibilities, and even to the necessity, of this class of machinery, and consider it a vital part of the equipment of a power plant, especially in connection with the handling of a storage supply of fuel, a feature for which every provident manufacturer now makes adequate provisions, in view of ever-threatening labor disturbances at the mines, car famines and similar conditions beyond his control. Any one of these might cause a shut-down of his plant, or force him to buy coal at emergency prices,—in either case compelling an expense probably equal to the interest on the cost of good coal storage and ash-handling plant.

Dearth of Information.

Presumably there exists quite a dearth of information on this subject in spite of the fact that very able papers have been presented relative to it before the A. S. M. E., and valuable articles have appeared in *Power and the Engineer,* in *Cassier's Magazine,* in *Electrical World,* in *Engining Record,* in the *Street Railway Journal,* and recently in *Engineering Magazine,* and perhaps one reason for the slow introduction of this type of equipment is to be found in the more or less antagonistic attitude on the part of the personnel in old established plants. Operating engineers and firemen do not seem to grasp the idea readily that if they are relieved of duties, heretofore part of their routine work, which can be performed as efficiently by either common labor or machinery, they will be free to prove their ability in other directions of far greater moment to the employer, who is never so imprudent as to dispense with the services of a man, whose work, whether in the nature of satisfactory performance of duties assigned, or in the successful completion of assumed tasks, designates him as an integral part of the organization.

In many plants we find engineers and firemen doing the work of coal passers, of laborers, of janitors, of cleaners, and of watchmen, besides

*Read at November meeting of Ohio Society of Mechanical, Electrical and Steam Engineers.

†Consulting engineer, Schofield building, Cleveland.

their regular duties in the engine and boiler rooms; and in the same plants, when trouble develops with electric lamps, with transmission machinery, with the heating system, etc., outside help is engaged at an addtional expense and delay. How inconsistent!

An Educational Factor.

In cases where the engineer is obliged to do his own firing, he could often perform the duties of an electrician, or master-mechanic, or millwright, if he were relieved of the work of shoveling coal and ashes, so that even in small plants there is a field for coal and ashes handling equipment. In larger plants, the boiler-room force can be materially reduced, space economized in, and the work done so much smoother and cleaner as a result of such installations, as we will attempt to indicate a little more fully in subsequent paragraphs. Due attention must be given to the fact that anything done to make the conditions, under which men work, more tolerable, will have a wholesome effect on maintaining a reliable and efficient organization.

Every ambitious man is concerned about doing the best kind of work of which he is capable, and such men consider the assignment of more and more difficult tasks, and the relief from duties, classed as unskilled labor, an indication of trust, and a promotion, even though it may not be immediately accompanied by an increased pecuniary remuneration. Increased earning capacity will always find recognition in due time. So the class of machinery in question can even pose as an educational factor, in bringing employes face to face with the fact that unless they strive to improve continually, they will be eliminated in the process of the "survival of the fittest."

Comparison of Systems.

The cost of handling coal and ashes by means of machinery varies between nearly as wide limits as the cost of manual labor to do the same work and depends largely on local conditions and on the "personal equation," which in the one case involves the physical capacity of man, and in the other case his ability as a competent designer and constructor, in either event, subject to large fluctuations.

In a certain foundry a man thinks he is greatly underpaid at $60.00 per month when required to take coal from a pile in the boiler house to which it has been delivered by wagons, or otherwise, and fire it at the rate of about two tons in ten hours, removing the ashes resulting therefrom in a wheelbarrow to a dumping place 100-200 feet distant, besides attending to the other duties of the engineer, in the boiler and engine rooms only, of a 60 horsepower plant. Charging one half of the engineer's time to the boiler room, and allowing the fact that he attends to some repairs to offset the fact that he does not have to unload the coal from the wagons or cars it costs about 55 cents per ton for coal and ashes-handling from car or wagon to ash pile.

In a paper mill of 1,500 horsepower (five 125-horsepower horizontal tubular boilers, two 310-horsepower Wickes, and one 150-horsepower Wickes), where coal is delivered in cars on a covered trestle adjoining the boiler house (sometimes in hopper bottom cars, more frequently in gondolas), the coal being wheeled from a pile under the trestle to piles in front of the boilers, from which it is "hand fired," there are employed three firemen at $2.25 per day, three coal passers at $1.80 per day on each of two twelve hour "shifts," besides four shovelers at $1.60 per ten hours, who unload two 40 ton cars of coal in each day shift, so that the cost of handling coal and ashes from car to ash dump (just outside the boiler house) is about 38 cents per ton net. If half of the salary ($3.00 per day) of the head fireman, who merely supervises the fire-room, and one-third of the salary of the chief engineer ($4.50 per day) are also charged to this item, as it rightly should be, this figure is changed to 42 cents per ton. In addition to this unwarranted expense, the ashes are shoveled into a wagon and hauled to a more remote place on the premises. The firemen and coal passers are worked so hard, as to force them to improve every opportunity to exchange their jobs for better ones, this making a permanent organization in this power plant an impossibility.

Another paper mill has ten 250 horsepower Wickes boilers, with Dutch ovens, supplied with Detroit stokers, and with provision for piling 3-4 tons of coal in storage above each oven. The coal is delivered in cars on an elevated trestle located in a building forming a "lean-to" with the boiler house, the partition wall containing large arches through which the coal flows or is shoveled into a pit within 8 feet in front of the stokers (about 7 feet deep by 12 feet wide), and extending along the entire length of the boiler house. Whenever a sufficient storage pile can be maintained under the trestle, enough coal flows through the arches into the pit to supply the ordinary demand. When the coal is not received fast enough, the storage pile is transferred to the pit by hand shoveling or with the aid of a power shovel. This pit is served by a traveling crane, handling a one yard dump bucket, and running the entire length of the boiler house. The bucket, when lowered into the pit, is filled by hand shoveling, raised to a point above the ovens and dumped by the operation of a latch from below. Underneath the furnaces there is a track on which runs a combination car and dump bucket, which, when outside of the tunnel, can be reached by the traveler, transferring the ashes dumped into it, twice per shift, to an elevated ash hopper at the end of the building, this hopper having an outside discharge spout, controlled by gate, from which the contents are drawn into wagons at convenient intervals. This plant employs on the day shift (11 hours) one head fireman at $2.25, one assistant fireman at $2.00, three coal passers at $1.75, and one shoveler at $2.00, who unloads two 50 ton cars per day, whether received in gondolas or hopper bottom cars (though probably the majority are of the latter kind and so stipulated in the contract for coal), and this rate of pay is fixed whether the cars come in uniformly or spasmodically. This day gang stores up a good deal of coal over the ovens and handles more ashes than the night gang, which consists of one fireman at $2.25, one assistant at $2.00 and two coal passers at $1.75, all working 13 hours, the two gangs alternating at regular intervals. Charging one-third of the chief engineer's time (at $6.00 per day) to the cost of handling and firing the coal and removing the ashes, we obtain a rate of 21 1/3 cents per ton and in severely cold weather, when the coal consumption is increased about one-fifth, without additions to the crew, this figure is reduced to about 18 cents per ton.

Suggested Improvements.

These are three representative cases, well known to the writer, and chosen at random for sake of illustration, though offering many points for interesting comparison.

In the first case no thought whatever was given to the matter of storage, nor even to the convenience of handling the fuel and ashes, though

with a suitable system, such as explained subsequently, the cost of coal and ash handling might have been cut at least in two.

In the second case some thought was given to the problem as shown by the fact that a trestle was provided. This, however, had but 7 feet of space below, giving an entirely inadequate storage capacity, though this was supplemented by space allowed on the side of the tracks away from the boiler house, all under cover, from which it was wheeled under the trestle to the boilers. The expensive item here, as in every case, is the shoveling and transferring. Had the trestle been of sufficient elevation, even though it may have required a car puller, hoppers with gates might have been constructed under the trestle from which the coal could have been drawn into cars, operating on an industrial railway track, being shoveled directly from the car (which can be provided with a drop side) into the furnaces, relieving the firemen of the back-bending and lifting action, thereby enabling them to attend to more furnaces, and at the same time keeping the boiler room in much neater condition. The coal might also have been taken from the bin gates into a dump bucket, carried on an electric hoist, operated on an over-head trolley system. This would not alleviate the work of the firemen perceptibly in regard to handling coal, but the transfer from bin to boiler would be facilitated, since motor driven trolleys might be used and several coal passers easily eliminated.

Possible Saving of 100 Per Cent.

Similarly pits might be built in front of the ash doors, into which the bucket could be lowered, so as to have the brim flush with the floor, enabling the ashes to be raked into it, instead of drawing them out on the floor and then shoveling them into a wheelbarrow, merely to transfer them to another place from which they must again be removed with due amount of labor. It is to be noticed also that in this case it takes four men to unload 80 tons daily, whereas in the third case, one man unloads 100 tons daily, though he probably receives more hopper bottom cars than the others. Inasmuch as he obtains the same wages whether putting in long or short hours, he has established for himself an entirely different standard from that actuating the other men.

An installation of this kind, at an expense of about $700.00 for the bucket, electric hoist, trolley and overhead track, and an expense of about $3,000.00 for elevating the tracks, installing hopper bottom bins with gates underneath, would eliminate at least two coal passers on every shift, and, if a better provision were made at the same time for unloading, and hopper bottom cars insisted on, at least two shovelers could be eliminated. This small installation would not cut down the number of firemen, but would ease their work materially, and make for a more permanent organization. Thus, at an expense of about $3,700-$4,000, a minimum saving of $10.40 per day could be effected, amounting to $3,796.00 per year, say $3,800.00 (the plant running continually for the entire year), which represents a justifiable investment of $25,306.00, allowing 5 per cent for interest on capital involved, and 10 per cent for depreciation. In other words, they would save annually nearly 100 per cent on the investment. It is doubtful if any other part of the plant could be made to bring such returns.

Design a Large Factor.

If stokers were installed, a further saving in coal and cost of firing could be effected, and if adequate coal storage were provided expensive delays and much anxiety could be prevented. This merely illustrates how by a simple improvement the cost of handling coal could be reduced from 42 cents per ton to 28¾ cents per ton, which is still a very high rate compared with plants in which all the refinements and latest developments in this line of machinery have been given due consideration at the time the plant was designed and installed.

In the last case cited (third case) the traveler was a very flimsy and poorly designed piece of machinery, and illustrates fully through the trouble it caused and through its slow operation, that the saving in the first cost of an installation, if made at the expense of quality, is usually found to be false economy, and in contracting for such work, competent engineers should be allowed to make the choice. Had the traveler been equipped with a grab-bucket, and provision made to have it serve a storage pile outside, and had a hopper bottom been placed under the trestle, so as to allow all coal to flow into the pit, a saving of at least $5.25 per day could have been effected (by eliminating three coal passers) at an expense of about $2,000.00 for the bottom under the trestle, and $4,000.00 for a new traveler with a grab-bucket. So an investment of $6,000.00 would produce a saving of $1,916.00 per year, which would really justify an expense of $12,733.00, allowing 5 per cent interest on the investment, and 10 per cent for depreciation. To build the proper kind of a storage yard, and to serve this with the same crane on a runway extended out through the building, would be possible, but not advisable. A conveyor could be installed to advantage and an installation of this kind might amount to from $5,000.00-$10,000.00, depending on the quality of the work.

System in Large Plant.

The purpose of this paper is not to review what others have ably written on the subject of coal and ashes handling machinery and to enter a full description of the various types of such machinery. It was hoped that through a simple discussion and enunciation of some very elementary principles, and by giving examples of how by almost "impromptu" installations, or make-shifts, substantial savings can be effected in old plants, a general interest in this subject might be awakened amongst our members and more data of actual cost of coal and ashes handling brought out and accumulated.

To give this question expert attention during the design of a large plant will bring out even more conspicuous figures.

Prof. G. F. Gebhardt in his book "Steam Power Plant Engineering" gives a description of various types of plants and cost data. Amongst these he gives as the cost of handling coal from coal car to ash car as from 10-18 cents per ton in large plants consuming 200 tons daily and equipped with stokers and conveyors, this including the wages of firemen and water tenders. In some plants the cost is divided as follows: (1) Cost of unloading from cars or barges; (2) cost of conveying coal into bunkers; (3) cost of feeding coal to furnace; (4) cost of removing ashes; but ordinarily the cost from coal car to ash car gives all necessary information for a basis of comparison. Prof. Gebhardt gives as an average figure for handling coal by barrow and shovel as about 1.6 cents per ton per yard distance wheeled, up to distances of 5 yards, and then about 1 cent per yard additional for longer distances. "With automatic conveyors the operating cost, including wages of firemen and water tenders varies with the size of the plant and the type of conveyor and ranges anywhere from a

fraction of 1 cent to 4 or 5 cents per ton. The larger the plant and the greater the amount of coal handled, the lower will be the cost per ton."

A number of specific instances are cited describing the equipment, giving cost of installation and cost of operation, which in one case is as low as 1.5 cents per ton in a plant consuming 1,600 tons daily.

Walter G. Hudson in two articles on this subject, appearing in the July and August, 1909, issues of the *Engineering Magazine* gives figures practically substantiating those given above and offers interesting dscriptions of a number of modern installations.

The use of screw conveyors, belt conveyors, pivoted bucket conveyors, flight conveyors, bucket elevators, coaling towers with grab-buckets, industrial railways, etc., are all given due consideration in these articles and disadvantages and conditions favorable to the installation of each, though that is beyond the scope of this preliminary paper.

Storage Bunker Design.

The question of design of storage bunkers is also pretty thoroughly covered, advocating provision for five-six days supply of coal. Attention might be called to the wisdom of dividing the bunkers into a number of individual bins, to prevent the spreading of fire in cases of spontaneous combustion, and in such cases a grab-bucket crane, operating on an I-beam track, or on a traveler above the bin, (from which the coal is spouted to the stokers), has asserted its superior advantages, being able to transfer coal from one bin to another until the source of trouble is reached, which can be eliminated with ease, whereas with conveyors supplying the bins, all coal has to be drawn off into the boiler room before the trouble can be remedied, causing annoyance and dirt. In a grab-bucket crane installation the trouble develops all in one place (the crane), whereas in a conveyor system, it may develop anywhere along a system extending over quite a territory, though the latter has the advantage of continuity of operation (it does not have to return light after the load).

The American Railway Engineering and Maintenance of Way Association has given this subject serious thought, and the report of a committee appointed to investigate the various types of railway coaling stations presents some very interesting reading matter. They describe (1) post or pillar cranes, on loading platforms, operating buckets; (2) trestles over bins, from which the coal is spouted into locomotives; (3) locomotive cranes with grab-buckets; (4) two buckets alternately raised and lowered, taking coal from a track hopper to an overhead bunker; (5) bucket elevators and conveyors, serving overhead bunkers; (6) belt conveyors; with a brief reference to (7) mono-rail grab-bucket cranes.

Results of Investigation.

It is interesting to note that in some cases the committee found the cost of hand shoveling from car to locomotive tender, as low as 10.7 cents per ton, while that of handling it by jib cranes was not found lower than 15.7 cents, and in some cases 24.5 cents. With gradual incline trestles, these figures have been found as low as 4.1 cents and upwards to 7.9 cents, though this cost is closely approached by bucket conveyor installations, 4.7-16.5 cents, and by belt conveyor installations, 4.9-8.1 cents, these figures being on the basis of receiving coal in cars, 85 per cent of which are self clearing (hopper bottom). In steep incline trestles, requiring power equipment for hauling the cars, in place of ordinary locomotives, the prices vary between 6 cents and 10.6 cents. With locomotive cranes and grab-buckets, the cost is about 5.9 cents and with installations employing the two buckets, operated similar to skip hoists, the cost has been found to vary from 6.2-13 cents. All these prices include interest and depreciation (based on the probable life of the plant), operating expense and maintenance, as well as a charge for car storage (the expense to the railway company of having cars standing idle, as compared with what they might be earning while in actual service.) The committee viewed with favor the use of mono-rail grab-bucket cranes and locomotive cranes for railway service, whenever self clearing cars in connection with trestles or conveyor systems described could not be secured.

Coal and ashes handling machinery is therefore seen to be a subject entitled to the careful attention of engineers and plant owners, and its field of application is not limited to the steam plant, since it is just as important in connection with gas producer plants, as well as industrial processes requiring coal in kilns, dryers, etc.

The new shops of the United Machine Co., Angola, Ind., have been placed in operation. They were recently erected at a cost of $125,000.

THE "VAUTIN" SYSTEM OF UTILIZING HEAT FROM SLAG.*

The production of steam power from the heat available in molten blast furnace slags opens up a new and important field for the use of the low pressure turbine. Many efforts have been made in the past to utilize this source of heat, but up to the present no practical method has been found, and it is largely to the developments of the turbine that Vautin's system owes its success. The process and plant covered by this invention are remarkable for their simplicity. Molten slag from one or more furnaces, which may be smelting iron, copper, or lead ores, is run either direct or through a "storage receiver" into a closed vessel or generator containing water. The slag yields up its heat with the formation of steam and is granulated by special means. The slag granules are continuously removed by an elevator arranged in a separate chamber, which forms a part of the generator. The continuous admission and removal of the slag is possible in consequence of the low pressure (about one pound per square inch) under which it is operated. The slag is admitted into the generator by means of a trapped inlet, so designed as to prevent the escape of the steam and to preclude the possibility of air finding its way into the generator, this latter precaution being essential to the efficient working of the turbine condenser. A head of about 8 inches of molten slag in the trapped inlet balances a steam pressure of one pound in the generator. To insure complete granulation, the molten slag after passing the trapped inlet and upon entering the generator is struck by a stream of hot water, delivered at high velocity by a centrifugal pump which draws its supply from the generator itself. This method of granulation causes no condensation of steam, as the water used is practically at the same temperature as the steam in the generator. The pump working in a closed circuit prevents the access of any air to the steam chamber. The elevator for removing the granulated slag is placed on the vertical side of the generator, with which it is connected at the pointed bottom, as shown in the following illustration. This arrangement prevents any air that may be carried down by the buckets from entering the steam chamber. When working at the normal pressure of about one pound per square inch, a head of two feet of water in the elevator casing will bal-

*Australian *Mining and Engineering Review.*

ance the steam pressure in the generator.

Available Power.

The amount of power obtainable from slags depends upon the temperature at which they are delivered. In a suitable generator from 900 to 1,100 pounds of steam (according to the temperature of the slag) at, say, one pound actual pressure at sea level, can be obtained from each ton of slag per hour; this quantity of steam represents from 26 to 30 horsepower, according to the efficiency of the turbine and condenser plant. The power available, allowing for radiation losses, etc., can be safely taken at 24 horsepower per ton of slag per hour, or one horsepower per ton of slag per day. This basis allows a fair margin for incidental losses. The only moving parts are the small motor-driven centrifugal pump and the slag elevator, consequently the power required is very small. The slight loss of heat which radiates from the surface of the water in the conveyor casing is reduced to a minimum by admitting the feed water into this compartment. The only other heat losses are due to radiation from the main casing and to the heat contained in the slag granules which are removed.

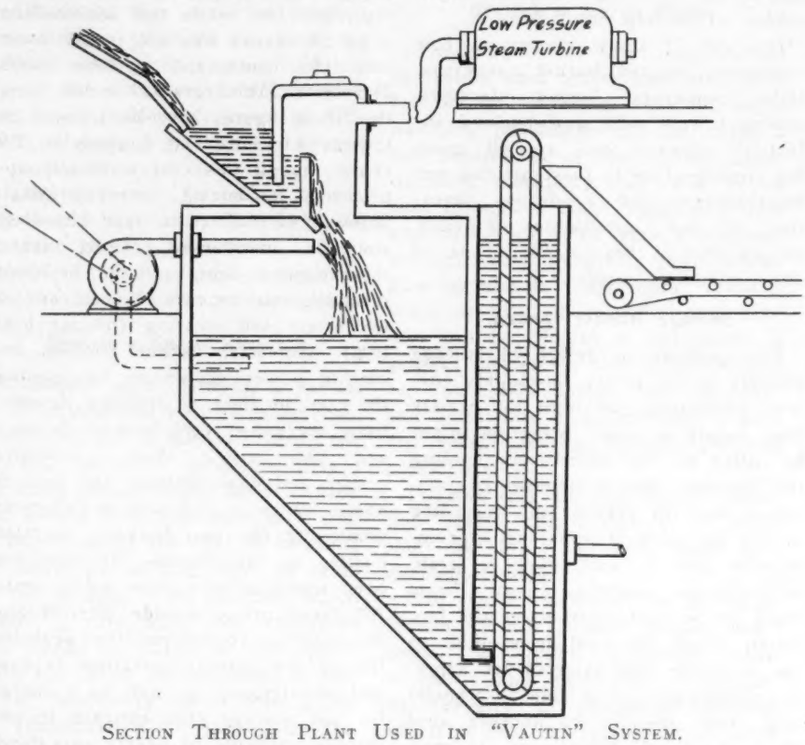
In order to provide against stoppages each generator can be provided with two trapped inlets, so that in the event of one becoming damaged the stream of slag can be diverted into the other, or (especially in large plants) two separate generators may be erected, so that the slag can be diverted from one to the other as required. In the latter case, the generators are suitably connected by piping, so that if No. 1 is working, the water in No. 2 would be heated so as to minimize the time of stoppage in the event of No. 1 going out of commission through any cause, and it became necessary to divert the slag into No. 2.

Description of Steam Generator.

The steam generator consists of an iron or steel vessel lined with non-conducting brick, set in the ground, so that the top is substantially at the same level as the source from which the slag is supplied. The generator has one vertical and three sloping walls, so that it comes to a point at the bottom where it is connected with the slag elevator. The inlet for molten slag, from the supply channel to the generator, comprises a reservoir with an inner wall, over which the slag flows into the generator, and a partition so arranged that the slag has to flow underneath it. The level of the slag is maintained above the partition on each side, so that if the pressure of the steam in the generator rises above atmospheric pressure, the slag will not be blown out at the inlet. The difference of level of the slag on the two sides of the partition allows for a slight pressure in the generator, whilst the trap prevents the admission of air to the steam chamber. The steam outlet is arranged so that in issuing from the generator the steam comes in contact with the inflowing stream of molten slag near the trapped inlet, whereby it is heated and dried.

In large copper and iron smelting works, where several furnaces are in operation, it is preferable for the slag either to flow directly, or to be conveyed by means of slag wagons, to one or more furnaces of the reverberatory type which act as a storage system for the molten slag, thus permitting an even and continuous slag-flow into the generator. In the case of copper smelting works this arrangement also acts as a "settler," permitting the recovery of suspended matte. The quantity of fuel necessary to maintain the slag at the temperature at which it leaves the blast furnace is comparatively small. The ease with which the granulated slag can be removed by conveyor offers an additional advantage over the usual method of dumping; this will be appreciated by large producers.

This system will produce the power necessary for blast refrigeration or "desiccation," which is now being adopted by ironmasters. Any form of low pressure turbine can be utilized with this system. The cost of an installation consisting of generator, steam turbine, dynamo and condenser, to utilize the heat contained in 500 tons of slag produced per day for generating 500 horsepower, is about £3,500. The cost of operating this system is confined to the upkeep of the elevator, centrifugal pump, and slag trap, to which must be added interest and depreciation.



SECTION THROUGH PLANT USED IN "VAUTIN" SYSTEM.

INTAKE SHAFTS FOR CHICAGO WATER TUNNEL.

The building of a new intake at the three-mile crib at Sixty-eighth street, Chicago, furnished a problem in foundry and machine shop practice which for a time seemed very difficult of solution. The plans called for two circular cast iron shafts, 42 feet deep, and 14 feet in diameter, to rest on hard-pan or rock, and connect with the three miles of tunnel from the crib to the shore, and which was cut practically all that distance through solid rock. These two cast iron shafts were composed of rings, in three segments, 9 feet 6 inches high, for the most part, a few of the rings being of lesser height. The larger rings weighed 35 tons each.

The machining of these segments and rings was a difficult task, but the entire job was completed without any

serious delay or set-back, by the contractors, the Jas. A. Brady Foundry Co., Chicago.

On account of the size of the rings, it was found that the ordinary shop equipment was unequal to the work of jointing and facing the various members and in consequence, special tools were improvised and erected in the open air. The segments were accurately faced and drilled and jointed with lead, so that when assembled they were absolutely water tight. Bronze bolts were used, instead of steel, to bolt the segments and rings together, in order to avoid corrosion.

The gates which control the flow of water to the intake are seated in brass and are machined and fitted so that they are perfectly watertight, and are opened and closed by means of screws operated from above. In case of necessity the flow of water may be cut off and the tunnel entered with safety.

Fig. 1 shows one of the rings in the shop yard, rigged for facing, an electric motor having been set up, a short distance in the rear to furnish power for the machining.

The arrangement of struts and braces carrying the bearings for the arbor are plainly shown. The facing tools are carried by the arms shown bolted to the face plate.

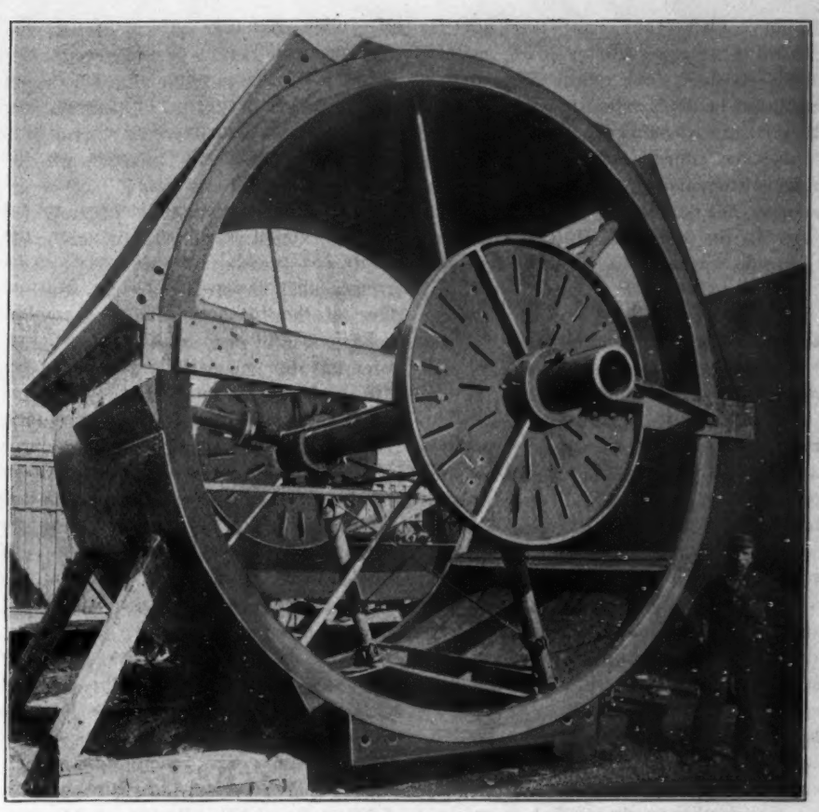


FIG. 1—SHOWING RING OF SHAFT FOR CHICAGO WATER TUNNEL RIGGED FOR FACING.

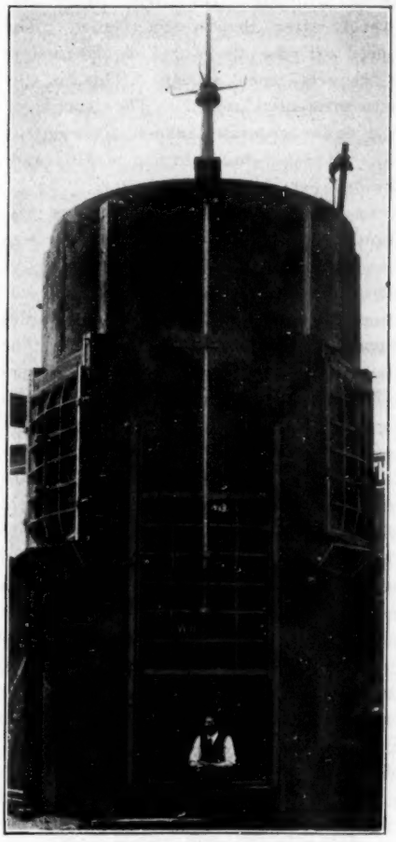


FIG. 2—SHOWING SHAFT PARTIALLY ERECTED.

Fig. 2 shows one of the shafts partially erected with the gates and operating screws in position.

THE RESICZA IRON AND STEEL WORKS*

A Description of Austro-Hungary's Largest Steel Producer

In the mountains of southeastern Hungary, in the V indicated by the Servian and Roumanian frontier lines, is Resicza. It is a small place so far as cities go, but it represents in its population one of the most interesting iron and steel works in Europe. What Krupp is to Germany and Le Creusot to France, so Resicza is to Hungary. A grade of steel is being turned out in these Hungarian works the equal, it is claimed, of the best in the world.

From Vojtek, where a change of cars is made, one travels toward Resicza through a magnificent stretch of farming country. Portions of this section can only be compared with some of the finest land in Nebraska. As far as the eye could reach there was a magnificent vista of waving wheat and corn fields.

Approaching Resicza a valley was observed, rockbound in its mountain fastness, but alive with furnaces and chimneys of a great modern steel plant. In Budapest I had met General Director Bela Veith, through whose courtesy every facility was accorded me to make an inspection at Resicza. On arrival at Resiczabanya, which is the works station of Resicza, I was received by General Manager Georg Marton and Engineers Moritz Weiss and Alexander Lam. I later met the engineer in chief of the machinery department, Mikles Balint, and in company with him and Engineers Weiss and Lam the machine-tool installation was inspected. The force actually employed at Resicza numbers about 6,000 men. The total force employed in all the shops and works of the company, having in

*Report in *Daily Consular and Trade Reports*, by Capt. Godfrey Carden, Special Agent.

mind only Hungarian territory, is 18,000.

The correct name of the concern controlling the Resicza works is The Privileged Austro-Hungary State Railway Co. The address of the first is Budapest, Hungary. At present the organization is that of a limited company and is the outcome of a gradual acquisition of stock originally controlled largely by French capital. In 1855 the Austrian government sold the property, which had been a state holding, to a private company, which at that time controlled a line of railway running across Hungary from north to south. The land purchased from the Austrian government approximated 330,000 acres. More than two-thirds of this area is covered by forest. Within this great holding are numerous mines furnishing all the essentials for the making of iron and steel, save the nickel and chrome used for mixture in producing special metal. Close to the iron and steel mines are great lime deposits, while the clay at Resicza is probably unexcelled for the manufacture of fire bricks. The greatest care is exercised for the conservation of the forest land, and where portions of land are cleared provision is made for new growths. The trees are generally cut down between 40 and 80 years of age. At the present time there are flourishing forests of fir, pine, and beech planted at periods of 80 to 120 years ago. As to the iron mines, the supply of ore, it is declared, is seemingly inexhaustible.

Output to Be Increased.

Resicza is essentially a steel-making plant, although the manufacturing end of the business is an important one. At the present time the annual production of steel is about 100,000 tons, the largest part of which is produced by the Martin-Siemens open-hearth process. The Bessemer plant produces 20,000 to 25,000 tons of Bessemer steel annually by means of three converters, each of 10 tons capacity. Fluid pig iron is cast in these converters direct from the smelting works, and the steel produced is largely used for rails.

The annual output capacity of raw iron at Resicza is about 65,000 tons, but this production, it is stated, will shortly be increased to 110,000 tons. The iron ore at Resicza is worked up at present in three blast furnaces, one having a capacity of 120 tons per day and two having a capacity of 70 tons each per day. A new blast furnace, now in process of building, is designed for a capacity of 250 to 300 tons per day. This new furnace is the design of Julien Kennedy, of Pittsburg, Pa. Arrangements for the building of this Kennedy furnace were effected, I am told, through Kennedy's European representative located in Brussels. There are five open-hearth furnaces in the steel works.

It is the practice at Resicza to fill 35 small ingot molds at one pour, the entire 35 molds being carried in a frame, the design of Georg Marton. One of the furnaces handles 36 molds.

Resicza has been utilizing blast furnace gas for the past 35 years, and today a large proportion of the power availed of is furnished by gas engines. Both blast furnace and gas producer are used. The gas producer system employed is of the Kerpely design. In all there are 14 gas producers in service for the steel making plant. In one central station there are four gas engines, each of 1,650 nominal horsepower, running at 97 revolutions per minute. The engines were built by Leng, of Budapest, after the Erhardt system. The generators are by the Union A. E. G., Vienna. These electrical generators are generating alternating 3-phase current of 20.8 periods, 5,500 volts, 1,100 kilowatts. All four engines are running in parallel, and parallel with a second hydro-electro centra station of 6,000 KVA capacity. These gas engines are running more smoothly than any gas engines I have seen in service on the continent. It was stated to me that they are giving little trouble and are very economical.

Washing the Gas.

Resicza employs the Veith system for washing gas, supplemented by an additional washing through the medium of the Theisen system. From the Theisen washers the gas goes direct to the gas engines without recourse to gas reservoir. In case the blast furnace gas gives out at any time the gas engines can be run on producer gas, but ordinarily the producer gas is utilized only for the furnaces. The producer gas, when used for power generating purposes, must naturally first be washed.

There are eight Bellville boilers in service and, in addition, there are 10 boilers in use similar in type to the Babcock & Wilcox. These latter boilers were made in Resicza. Blast furnace gas is used for firing in connection with these boilers. With the exception of three pumps of American design all the pumps in service have been built at Resicza. The air compressors, furnishing the air for the blast furnaces, are supplied with motors from Siemens & Halske. There are four of these motors direct connected to compressors of 280 horsepower each. There are also two horizontal compound steam driven blowing engines of 650 horsepower each. A turbo-compressor, with a capacity of 1,000 cubic meters (35,316 cubic feet- per minute, and direct driven with a 2,000 horsepower electrical motor, will furnish the necessary air to the new blast furnace.

Rolling and Other Mill Plants.

In the Resicza rolling mill plant the heavy mills, such as blooming mill, the structural iron mill, and the heavy plate mill, are driven by two sets of electric motors, each capable of yielding a maximum of 10,000 horsepower. There is also a steam engine of 4,000 horsepower which is held in reserve. The electrical engines permit of reversing from maximum to maximum in 8 seconds. The maximum number of revolutions is 150 per minute. These engines are used in connection with the manufacture of rails, plates and blooms. The diameter of the largest roll in the blooming mill is 1 meter (3.28 feet), and the ratio of gears is one to two. The mills are all reversible from both sides of couplings. The motors yield 2,000 horsepower effective, and give 10,000 horsepower through the help of a flywheel, after the system Ilgner. The speed of the fly wheel is 90 meters (295 feet) per second. This is the circumferential speed. The speed of the motor generator, which gives energy for the reversing motors, is 410 revolutions per minute.

In addition to the central power station, operated by gas engines, Resicza is availing of 4,000 horsepower electric power from a hydro-electric station, distant not more than 3 miles from the center of the works. The waterfall at this station is 217 meters (712 feet) in length. Three turbines are installed, each yielding 2,500 horsepower, working in connection with Pelton wheels, and equipped with automatic regulators. The generators yield 5,500 volts 3-phase current of 20.8 periods per second, running at 312.5 revolutions per minute. The generators were built by the Siemens-Schuckert Works of Nurnberg.

In addition to the foregoing rolling mill, mention should be made of the sheet plate mill which is being operated with Ganz motors of 900 horsepower, 500 volts 3-phase current. These motors are coupled direct to roller shafts and afford a speed of 50 revolutions per minute.

There is also at Resicza a 3-high rail mill, equipped with three sets of

rolls, steam driven. This mill is German built, but, I was assured, it is in reality English in design. The reversing mills previously referred to were also built by Germans; that is to say, the mechanical part of the mill is German in all respects except the electrical equipment. There is at present at Resicza an old rolling mill which is referred to as the merchant mill, the equipment of which is to be entirely torn out and replaced with new mills, operated by steam and electric drive. There is required for the new equipment 4,000 horsepower. I understand that Resicza is desirous of receiving this millwork from American sources. With this object in view, inquiries were recently made of one American firm.

The Railway-Tire Mill—Miscellaneous Machines.

The tire mill at Resicza produces tires from 500 to 2,500 millimeters interior diameter, and is turning out probably as fine work as can be found anywhere in Europe. In the United States, Bethlehem, Midvale, Chrome, and Latrobe may be said to be doing work similar to Resicza, but in Hungary, Resicza is the only source for steel tires. There is no denying that the tire work at Resicza is most skillfully handled. The equipment for the tire shop is practically all English. On entering the tire mill I heard what appeared to be an unmistakable sound of many wonderfully toned bells. The sound, I later found, came from workmen knocking off heat scales from numerous locomotive tires, but the ring from the hammers gave evidence of the splendid quality of the steel. Resicza supplies practically all tires used in high-speed equipment on the Hungarian railways.

In the car wheel molding department German molding machines are used. The loading cranes for loading rails have been supplied by Simmering, Vienna. I observed two heavy cold saws in the rail department which have been furnished by Heinrich Ehrhardt, Dusseldorf. Wagner & Co., Dortmund, have supplied a heavy punching machine for splice bars, one double punch of 400 tons pressure, and five rail milling machines. Sack, Rath, has supplied one very heavy double punch of 500 tons pressure. The frame for this punch was made at Resicza. Shultz & L. Gobel, Vienna, have supplied a punch machine, and I was informed that this last-mentioned Austrian tool is liked better than the Wagner or Sack punches.

Brickworks and Brickmakers' Dwellings.

Resicza is making all its own fire brick and has a very complete plant for this industry. There is a Robbins type of belt conveyor in service in the brickworks. The gas used for drying the bricks comes from two producers of the type of the Morgan Construction Co. These producers were built by Resicza. Women are employed to a large extent at the brickworks. I observed that blast furnace slag is being worked up into brick. The slag is granulated by water and is mixed with lime and pressed into brick. These slag bricks are air dried for a period of about 6 months and later are used for building purposes. They are cheaper than burnt brick, but naturally are not as good, since the mechanical strength is inferior. I observed one American pump at the brickworks, but aside from this pump the equipment is largely German. Most of the brickworks' equipment came from Osnabruck. Beyond the brickworks, and nearer to the water power plant, are a number of dwellings which have been erected by Resicza for the use of the workmen. These houses are mostly provided with three rooms and kitchen, and are rented, I understand, for about 12 crowns ($2.44) per month.

Anina Coal, Charcoal, Iron Foundry, Etc.

Not far from Resicza is the town of Anina, where the Resicza company has important mines and an iron foundry for general castings, but especially for pipes. Anina is distant about 14 miles to the south of Resicza and may be said to be a complete plant in itself. Here is a blast furnace installation, a very large coal washing system, and complete works for making screws and bolts. A little to the west of Anina the Resicza company possesses a complete flour mill. This mill is located at Oraviczabanya. At Roman-Bogsan the Resicza company conducts the manufacture of agricultural implements.

The best coal in Hungary is reputed to come from Anina. Resicza undertakes to manufacture its own charcoal, and for this purpose does not have to go beyond its own forests for wood. The annual output capacity of the charcoal plant is 15,000 tons. This charcoal plant is producing wood alcohol, which is sold for the most part to German dye works. The alcohol capacity per day is 800 liters (845 quarts). The coal mined in Anina is rich in lyas. A remarkable property of the lyas coal of Anina is its suitability for the production of coke. There is an annual nual output of about 300,000 tons of this lyas coal. The percentage composition of Aninan coal is as follows: Solid carbon, 66.76; volatile constituents, 29.89; water, 1.60; ash, 10.57; sulphur, 0.59. The products of the Aninan mine, as well as those of Resicza, are treated for the most part in the company's furnaces, the remainder being sold. For the purpose of converting the various coal mined into coke there are 60 furnaces in Resicza and 84 in Anina.

Output and Machine Tools in Use.

The manufacturing works at Resicza is concerned largely with equipment for railway bridges and iron construction, ship and engine parts, and at the present writing there are extensive orders in hand for field-artillery equipment. Resicza has been called upon during the past five years to supply stem and stern frames and other pieces for the Armstrong works of England, and for Ansaldo, of Genoa, Italy, for use in war ship construction. In the machinery department the number of machine tools approximates 350. These machines are almost without exception driven by electric power derived from overhead shafting. This electric drive is by induction motors of 20.8 per second alternations and 500 3-phase voltage.

In a great plant like Resicza I fully expected to find a first-class showing of American machine tools. There are some excellent tools of American make in evidence, but the number is very small, including three turret lathes, four grinders, two vertical drills, three milling machines and a gear cutter.

The main machinery building is employing at present about 1,400 men. The greatest number of machine tools from any one firm in this building is probably from Vulkan. Vulkan has furnished a great variety of machines, but the Vulkan lathe is the one type of tool most in evidence. There were a number of vertical millers of Vulkan manufacture, closely resembling the Becker design. There were some German vertical millers in evidence which also seemed to be built on Becker lines. Alfred Herbert Ltd., Coventry, England, has placed some sensitive drills, and Zimmermann, Chemnitz, has provided a number of heavy lathes. One heavy tool of the lathe type was noticeable, apparently English in build, but without the name of the maker showing. Whitworth, Manchester, England, has supplied a heavy lathe, and Ernst Schiess has installed a large-sized planer. Vulkan has supplied some cold-steel saws, as has also De Longdoz and also Deneffe, both of Belgium.

There was a quantity of railway carriage bearing boxes and bearings in

process of construction. Resicza uses cast iron for these boxes, filled in with white metal, and forms the bearing with a cold mandrel. There is no machine work on these bearings. Among other foreign tools in use were slotters from Loewe and Vulkan heavy vertical millers from Kendall & Gent, Manchester, England; shapers, vertical millers, boring mills, planers, and gear cutters from Vulkan; traveling cranes from Ganz; vertical miller from Fairbairn, of Leeds; a heavy vertical miller from De Fries; thread cutters from Zimmermann, milling machine from Buckton, of Leeds; and a radial drill from Whitworth. Both the Deutsch-Niles Werk and the Globe Pneumatic Engineering Co., Ltd., the latter of London, have supplied pneumatic tools.

Vulkan has furnished a small grinder, which is in use in the machinery department. Considerable machining work was in progress on locomotive wheels and rolling mill equipment, and attention was called to some fine casting work for screw presses. All tires are flanged on hot to the wheels by transmission hammers, this process being equivalent to riveting. Practically all work in the machinery shops is piecework.

There is much bridge construction work now in progress at Resicza, and I observed that oxygen gas cutting machines are employed. Mr. Balint has designed a guide pointer for the burner of this device which makes it possible to run the tool close to the metal and to guide more accurately the cutting operation. The oxygen gas machine is cutting nickel chrome steel 5 millimeters thick at a rapid rate. Schultz & Goebel have supplied some heavy shearing machines for use in the bridge building shops.

The annual output of iron ore from all the mines of the Privileged Austro-Hungarian State Railway Co. is about 200,000 tons. The manganese ore used in the manufacture of raw iron is produced from the company's own mines, the annual output being about 10,000 tons. In addition to iron ore, sulphurous siliceous deposits are found in the southern parts of the mining district, while considerable quantities of cuprum ore are found in scattered masses in the district of Csiklova. The products of the mines are sold for the purpose of being smelted and further worked up.

In the working up of raw iron, gray Bessemer and Martin raw, half white, are produced in Resicza, while Anina affords gray cast iron and white wrought iron. The refineries of the company are the Bessemer, Martin, and crucible furnaces at Resicza and a puddling plant at Anina. Resicza produces about 1,000 tons of crucible steel per annum. This crucible steel is used for hoops, wheels, armor plate, and other special castings. The crucibles are made in the company's brick kilns.

The particular ingredients of the different kinds of steel produced are as follows:

	Bessemer steel.	Acid.	Basic (hard).	Basic (soft).	Crucible.
C	0.343	0.272	0.245	0.07	0.650
Si	0.040	0.1570	0.080	0.02	0.164
Mn	0.150	0.198	0.300	0.12	0.507
Cu	0.06	0.056	Trace	....	.....
P	0.080	0.087	0.048	....	.....
S	Trace	.....	Trace	....	.....

The Resicza and the Anina rolling mills turn out on an average of about 100,000 tons of rolled iron yearly. Of this quantity about 25 per cent is in railway rails, 10 per cent in rough and fine plates, 5 per cent in hoop iron, 20 per cent in girders, and 40 per cent in various kinds of rolled iron.

The machine and forging shops combined afford a yearly output of about 10,000 tons of material, consisting in the main of railway car wheels, mounted on axles, steel forgings, rough and machined, and steel castings. The bridge shops are producing annually about 4,000 tons of varied iron construction, railway switches, and crosses. The nail and screw factory at Anina produces as high as 2,500 tons of finished nails and screws annually.

The building of agricultural implements at the Roman-Bogsman plant is confined principally to iron plows and field implements. The present annual output is about 12,000 iron plows, 5,000 skeleton plows, and from 200 to 300 tons of other agricultural machines. It is proposed to extend the Roman-Bogsan plant so as to include a tool making shop.

The annual output at the brick kilns in Resicza is 1,800 tons of tile and nearly 1,000 tons of fire bricks. As high as 4,000,000 bricks are made annually from the granulated blast furnace slag. In addition there is a brick kiln which the company is operating in Roman-Bogsan, annually producing an average of nearly 3,000,000 building bricks.

The company's limekilns in Kolcza and Cravicza have an annual output, respectively, of 6,000 and 8,000 tons of burnt lime.

In Oravicza a cement factory of the same company is producing annually about 2,500 tons of cement, and in Cravicza there is a petroleum refinery and machine factory having an annual output of from 6,000 to 8,000 tons.

There are about 100 kilometers of railway, part of which has three rail tracks, with 1,436 and 950 millimeters gage, respectively. In all there are 15 locomotives and about 500 trucks and cars utilized for transport service in hauling raw material and finished products.

For the protection of the mines, forests, and factories, there is a guard force of not less than 700 men. This force is additional to the total force of 18,000 workmen carried on the pay rolls of the Privileged Austro-Hungarian State Railway Co. No other company in Hungary occupies so important a position in the economic development of the country, and its prosperity may well be taken as indicative of conditions generally in the Hungarian territory.

ELECTRIC SMELTING COSTS IN SWEDEN.

In a recent report from Stockholm, Sweden, to the Canadian department of mines, Sir Cecil Spring-Rice makes the following statement regarding the development of electric smelting in Sweden:

Arrangements have been made with the Trollhatten Water Power Co. for the construction and working of three electric furnaces for the production of pig iron. Each furnace is to receive a current at about 1,900 kilowatts and to produce 7,500 tons per furnace per annum. Two are to be in working, while the third is in reserve. The price of the current per horsepower per annum is 27.60 kroner ($0.268) for the first 10 years, and 36.80 kroner the next 10. The ore is to be brought from Grangesberg, containing from 0.4 to 1.9 per cent phosphorus. Westphalia coke will be used, costing about 21 kroner at Trollhatten. It is calculated that the cost of production will be 51 kroner per ton pig iron. The sale price is 58 kroner. With a production of 15,000 tons per year, the cost is calculated as follows:

	Kroner.
Three furnaces	159,000
Tools, etc.	15,000
Crushing apparatus for 35,000 tons ore and 7,000 tons coke	9,000
Electric motors, lighting, etc.	6,000
Transport of ore and coke from harbor	15,000
Transport of pig iron and slag	12,000
Houses and shelters	64,000
Harbor works, leveling, etc.	13,000
Laboratory, unforeseen, etc., 11 per cent	20,000
License	34,000
Working capital	25,000
Minimum capital	235,000
Total	600,000

—*Electric Review and Western Electrician.*

Stock Market Moderately Active

The market during last week was generally strong, but with occasional set backs, and moderately active. The English bank rate was reduced to 4½ per cent, being the first reduction since the upward movement started about 10 weeks ago. Gold exports continued, and there was an excited rise in the price of cotton when the government report showed the crop to be the smallest for the last six years.

Monday the market was heavy throughout the day. Reading furnished about one-third of the total business, and closed slightly higher. Tuesday, under the leadership of steel common, the market advanced, and closed firm and higher. The government report on winter wheat showed conditions favorable. President Taft's message, which was made public, had no great effect upon market conditions. Wednesday's stock market was more active and irregular; Steel common lead the advance which was followed by recessions later. The Gould interests retired from their controlling position in the Western Union Telegraph Co., and were replaced by the American Telephone & Telegraph Co. interests. Thursday the stock market was active and irregular; Pennsylvania was the market leader, and scored considerable advances; the Bank of England rate was reduced from 5 to 4½ per cent; cotton advanced to the highest price of the year. On the Pittsburg market, Crucible Steel made a new high record. Friday the market was irregular, and closed with no considerable change. The government estimate on the cotton crop of 10,088,000 bales created great excitement in the cotton market; the Copper Producers' Association reported a decrease of 506,000 pounds in stocks for the month of November, and copper stocks declined. Saturday the market was dull and irregular.

Call money during the week varied from 4 to 5 per cent, with 4¾ per cent the usual rate. Time money remained unchanged throughout the week and the market was dull.

Bank clearings in the United States for the week were estimated at $3,426,851,187, which was 8 per cent higher than for the corresponding week last year. The actual report of clearing house banks showed surplus increased $242,250; loans increased $5,715,900; deposits increased $10,975,800 and the ratio of reserve 25.9, against 26.2 the week before. Trust companies and non-member banks showed loans increased $1,019,500; deposits decreased $3,646,800, and the percentage of reserve 16.9 against 17 the week before. Exports of gold from New York, as reported by the custom house, amounted to $1,978,000, mostly to South America.

Imports of gold for the week were $340,576. Failures during the week numbered 254, against 283 the preceding week, and 312 the corresponding week last year. Liabilities in failures reported for the month up to Dec. 11 were $4,896,259, against $3,738,172 for the corresponding period a year before. The number of shares dealt in on the New York stock exchange was 4,441,600, against 5,810,600 the week before, and 4,918,749 the corresponding week last year.

Bonds, other than government bonds, were sold to the amount of $24,517,000, against $25,358,000 the week before, and $38,129,000 the corresponding week last year.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. Dec. 11	Changes in week	Date 1909 Ann.	M't'g.	Stock Outstanding	Dividend Basis	Dividend Last Declared	Dividend Date Last Div. Pay.
Allis-Chalmers	15⅛	— ⅜	Sept.	2	$19,820,000		.....	.....
Allis-Chalmers, pr.	53¾	—1⅛			16,150,000	7 cum.	1¾ Q.	Feb., 1904
American Can	14½	+ ⅜	Feb.	2	41,233,300		.....	.....
American Can, pr.	84½	+ ¾			41,233,300	7 cum.	1¾ Q.	Jan., 1910
Am. Car & Fdy.	72	— ¾	June	24	30,000,000		½ Q.	Jan., 1910
Am. Car & Fdy., pr.	119	.....			30,000,000	7 n. c.	1¾ Q.	Jan., 1910
American Loc.	61⅜	—1⅜	Oct.	19	25,000,000	5	1¼ Q.	Aug., 1908
American Loc., pr.	113	—1⅞			25,000,000	7 cum.	1¾ Q.	Oct., 1909
American Ship.	80⅛	+12¾	Oct.	13	7,600,000	4	1 Q.	Oct., 1908
American Ship, pr.	110¾	.....			7,900,000	7 cum.	1¾ Q.	Sept., 1909
Am. Steel Foundries(new).	65¼	+ ⅜	Dec.	2	17,184,000		1¾ Q.	.....
Barney & Smith	40	.....	June	1	2,000,000	4	.....	Sept., 1907
Barney & Smith, pr.	105	.....			2,500,000	8 cum.	1 Q.	June, 1908
Bethlehem Steel	34¾	— ¼	April	6	14,862,000		.....	.....
Bethlehem Steel, pr.	68	+ ½			14,908,000	7 n. c.	¾ Q.	Feb., 1907
Cambria Steel	46⅞	+ ⅞	Mar.	16	45,000,000*	3	¾ Q.	Aug., 1909
Cambria Iron	46	+ ¼			8,468,000*	4	2 S. A.	Sept., 1909
Chicago Pneumatic Tool.	37½	— ¼	Feb.	15	6,145,000	4	2 S. A.	Oct., 1907
Colorado Fuel	51¼	+ ⅛	Oct.	18	34,235,500		1¾ Q.	April, 1902
Crucible Steel	15⅜	+ ¾	Oct.	20	24,578,400		3½	.....
Crucible Steel, pr.	94¼	+4⅜			24,436,000	7 cum.	1¾ Q.	Dec., 1909
Empire Steel	12	.....	April	27	1,254,770		.....	.....
Empire Steel, pr.	75	.....			2,500,000	6 cum.	3 S. A.	July, 1909
Fay & Egan	90	.....	Feb.	18	1,000,000	7	3 S. A.	Nov., 1908
Fay & Egan, pr.	120	+10			1,000,000	7 cum.	1¾ Q.	Nov., 1909
General Electric	160¾	+1¼	May	11	65,179,600	8	2 Q.	Jan., 1910
Harbison-Walker	36	.....	Jan.	18	18,000,000		2 Q.	Oct., 1907
Harbison-Walker, pr.	95	.....			9,600,000	6 cum.	1½	Oct., 1909
International Pump	51	— ¾	June	8	17,762,500		1 Q.	April, 1905
International Pump, pr.	90⅜	+ ⅞			11,350,000	6 cum.	1½ Q.	Nov., 1909
Lackawanna Steel	62	.....	Mar.	10	34,978,000		.....	.....
Lake Sup. Corp.	28	+1	Oct.	6	40,000,000		.....	.....
New York Air Brake	94½	+1	June	17	10,000,000	8	2 Q.	Oct., 1907
Niles-Bement-Pond	100	.....	Feb.	3	8,500,000	6	1½ Q.	Dec., 1909
Niles-Bement-Pond, pr.	102	.....			2,000,000	6 cum.	1½ Q.	Nov., 1909
Otis Elevator Co.	54	.....	Mar.	15	6,375,300	3	1½ S. A.	Oct., 1909
Otis Elevator Co., pr.	96	.....			6,295,000	6 n. c.	1½ Q.	Oct., 1909
Pa. Steel	65	.....	May	10	10,750,000		.....	.....
Pa. Steel, pr.	113	.....			16,500,000	7 n. c.	3½ S. A.	Nov., 1909
Pittsburg Coal Co.	27¾	+ ¾	Mar.	9	28,104,600		.....	.....
Pittsburg Coal Co., pr.	69½	+2½			27,071,800	7 cum.	1¾ Q.	April, 1905
Pressed Steel Car	52¾	— ⅛	Feb.	17	12,500,000		1 Q.	Aug., 1904
Pressed Steel Car, pr.	105	— ½			12,500,000	7 n. c.	1¾ Q.	Nov., 1909
Pullman	191	+ ¾	Nov.	10	100,000,000	8	2 Q.	Nov., 1909
Railway Stl. Spring	51	+ ⅛	Mar.	4	13,500,000	2	1 S. A.	Oct., 1908
Railway Stl. Spring, pr.	106½	—2			13,500,000	7 cum.	1¾ Q.	Dec., 1909
Rep. Iron & Steel	46½	.....	Oct.	20	27,191,000		.....	.....
Rep. Iron & Steel, pr.	106½	+ ¼			20,416,900	7 cum.	1¾ Q.	Jan., 1910
Sloss-Sheffield	88	—1	Mar.	10	10,000,000	5	2 Q. †	Nov., 1909
Sloss-Sheffield, pr.	119	.....			6,700,000	7 n. c.	1¾ Q.	Oct., 1909
U. S. Pipe & Fdy. Co.	32	—1	June	23	12,106,300	2	1 Q.	Dec., 1907
U. S. Pipe & Fdy., pr.	84	.....			12,106,300	7 n. c.	1¾ Q.	Dec., 1909
U. S. Steel	91	+ ¼	April	19	508,302,500	3 n. c.	¾ Q.	Sept., 1909
U. S. Steel, pr.	125½	+ ⅜			360,281,100	7 cum.	1¾ Q.	Aug., 1909
U. S. Steel, 5s.	105⅜	+ ⅜			463,398,000	5	.....	.....
Va. Iron, Coal & Coke	72	+1	Sept.	21	9,073,680		.....	.....
Westinghouse Elec.	84	+ ⅛	June	16	27,173,200*		1¾ Q.	Oct., 1909
Westinghouse Air Brake	150	+7	Oct.	5	14,000,000*		4 Q.	Oct., 1909

Par value of shares, $100, except those starred (*), $50.
†Includes deferred dividend of ¾ of 1 per cent.

Copper Stocks.

New York.—Amalgamated Copper closed at 87, an increase of ⅞.

Boston.—Butte Coalition closed 29, unchanged; Calumet & Arizona closed 102, unchanged; Calumet & Hecla closed 650, a net gain of 5; North Butte Mining closed 55, a decrease of 7; Quincy Mining closed 85, unchanged.

ENGLISH IRON IMPORTS

Are in New Hands, Showing Little Profit Thus Far.

Certain features of the pig iron situation, particularly as it affects the cast iron pipe interests, are exciting comment in New York and its vicinity. In spite of the current lull in buying by practically all consuming lines, the demand from pipe foundries continues to hold up extremely well and some purchases are being made all the while. There is an especially brisk call for the lower grade irons on which pipe interests are unwilling to close at full market prices; but they are quick to snap up offerings of No. 3 and 4 foundry and gray forge at concessions of 25 cents from the regular level. They have been benefited but little, however, by the recent offerings of speculative iron, as it was practically all of better grade than they cared to buy, one well-informed factor in the trade stating that there is not now as much as 1,000 tons of low grade irons suitable for pipe foundry purposes in speculative hands, either north or south.

The purchases of British iron by pipe works adjacent to the Atlantic seaboard so far have been relatively small, giving the impression that they were made principally with the idea of holding down domestic prices on the irons desired by keeping before the trade the possibility of filling their requirements from the Middlesbrough district. The tonnage so far brought in by one interest which heretofore has figured prominently in the importation movement has been decidedly small; while another pipe concern, which brought over a large cargo, made rather vigorous efforts to dispose of the iron with little success.

In this connection it is an interesting fact that practically all the importing during the current movement has been by selling interests which were not active in the heavy movement of two or three years ago. Of the four or five concerns which were large importers at that time, two or three have not concerned themselves actively with the present opportunities for importation; another bought heavily of Cleveland warrants only to dispose of them later in the British market, taking a moderate profit rather than undertake the risks incident to bringing over the iron they represented; and another large house has arranged for only two cargoes. The present movement is almost entirely in new hands and, with one or two exceptions, it is understood that the cargoes brought over have shown little or no profit. The outlook for the enlargement of the movement is by no means flattering.

STEAM SHOVEL PLANT REMOVES.

The Ohio Steam Shovel Co., formerly of Toledo, O., has been purchased by Cincinnati capitalists and the entire plant, including all patterns, drawings, material, etc., has been removed to Cincinnati, O. All inquiries, orders for repair parts, etc., for Ohio Steam Shovels should hereafter be addressed to The Ohio Steam Shovel & Dredge Co., Cincinnati, O.

The business is being handled by F. A. Peckham and H. L. Hoeffer, both of Cincinnati, O., and P. B. Warner, 916-17 Pennsylvania building, Philadelphia, Pa. Earle J. Banta, M. E., who has been mechanical engineer on the Panama canal for several years, is chief engineer and in full charge of the designing and shop production department.

ON RAILWAY RATES.

Charles A. Schieren, head of the leather belting house of that name, has been appointed chairman of the committee on railroad rates for the Chamber of Commerce of the state of New York. This committee will "consider the questions relating to railway rates between New York and the interior, for the purposes of protecting the Atlantic seaboard." This action grows out of the so-called "Spokane case," involving the application of the short and long haul principle.

OVERLAND HAULING OF ORE STOPPED.

Overland hauling of iron ore from the Cady mines to Elmwood, for rail shipment to the furnaces at Spring Valley, Wis., has been stopped by bad roads and until the highways freeze up no more hauling can be done. The haulers have been paid 60 cents a ton, hauling about 3½ tons per load. The record haul for this season is 4 1/3 tons. In winter a hauler can make three trips a day, hauling from 8 to 10 tons to the load.

At the furnace Cady ore and Gogebc ore are beng mxed two parts to one part, respectively, for low sulphur iron production.

The Lackawanna Steel Co. blew out its No. 3 stack at Buffalo, Nov. 28, for repairs.

HIGHEST FIGURES

Reached in Coke Production Possible With Present Capacity.

Estimates of weekly coke production in the Connellsville regions have reached about the highest possible figures, considering the present oven capacity. There is some interference with full production due to car, water and labor shortages. The Coke Producers' Association in its review of conditions under date of Dec. 8 says:

During the past three weeks our reports show but little change in the coke situation. Of the available ovens in the region at this time 91.6 per cent are now active and production has averaged around 448,000 tons. This estimate of production is over rather than under the actual production, owing to the occasional idleness of ovens at many of the works due mainly to car and labor shortage.

The present estimated production is regarded just about up to what can be expected from the number of ovens now in existence, and the number is not likely to be materially increased in the very near future. Several plants now being constructed expect to have a few ovens ready for operation by the first of the year. The Thompson Connellsville works with 800 ovens have been completed and just about running full. The Tower Hill Connellsville Coke Co. is adding a few new ovens almost each week, but the increase, as a whole, will not greatly increase production.

Some works report that they are behind on orders due to occasional car shortages.

Inquiries have been more plentiful during the past week or so aggregating 50,000 tons a month.

In a general way conditions last week were practically the same as for the past three weeks.

SEATTLE OFFICE OF METAL TRADES WILL NOT CLOSE.

At a recent meeting of the Seattle branch of the United Metal Trades Association of the Pacific coast it was unanimously voted not to give up the central office of the Association in Seattle, but to retain it permanently. This action was taken in order to prevent any falling off in the efficiency of the Metal Trades Association work at this time. No steps were taken, however, to seek a successor to Commissioner H. S. Hastings.

Tidewater Steel Co. preferred stockholders will be paid 20 per cent of the par value of their stock in 6 per cent bonds, is the statement coming from the stockholders' committee.

Joliet stack No. 2, of the Illinois Steel Co., was blown out Nov. 25.

NEWS FROM MANY INDUSTRIES

(In order to assist the post offices in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

New Buyers:—

The following companies have filed articles of incorporation:

The Bucyrus Foundry Co., Bucyrus, O.; $50,000; by C. L. Markel and others.

The Nelson Foundry Co., Milwaukee; $6,000; by Carl J. Nelson, W. E. Glantz and Emil Kurtz.

The Southern Iron & Metal Co., Beaumont, Tex.; $5,000; by W. M. Crook, E. Marx, A. Blieden and others.

The Puxico Iron Co., Cape Girardeau, Mo.; $50,000; by Charles J. Crawford, Albert J. Meyers, Edward D. Hays.

The Heer Engine Co., Portsmouth, O.; $50,000; Chris Heer, George A. Selby, G. M. Appel, Fred N. Tynes and H. W. Heer.

The Yuster Axle & Transmission Co., South Bend, Ind.; $100,000; automobile parts; directors, M. L. Yuster, A. E. Wile and Joseph W. Rickets.

The Somerville Stove Works, Somerville, N. J.; $125,000; by Michael Baum, Charles L. Voorhees and James Q. Ten Eyck; stoves, ranges, heaters, steam boilers and castings, etc.

The Atlantic Radiator Co., Tyrone, Pa.; $450,000. Edward P. Harrington, New York City; O. Perry Sumter, Tyrone, Pa.; George T. Townsend, Wilmington, Del.

Sheffield Tool & Supply Co., Sheffield, Warren county, Pa.; capital, $35,000; incorporators: S. S. Bryner, C. A. Gilson, G. W. Wood, C. J. Gibson and J. G. Richards, Warren.

Iron City Stamping & Mfg. Co., Pittsburg; $50,000; incorporators: S. C. Graham, H. L. Schuck, Mrs. Johanna Schuck, J. Graham and C. S. Nordheimer, Pittsburg.

The Interlocking Co., Parkersburg, W. Va.; to manufacture and sell improvements in nut locking; $60,000; by W. C. DeCamps, A. G. Jackson, E. E. Schirmer, H. C. Jackson and A. C. Adair, all of Parkersburg.

New Construction:—

The American Steel Foundries is planning to erect a new core shop at its Chester, Pa., plant, 40 x 100 feet.

The Pittsburg Valve & Fittings Co. is adding a wing to its malleable iron department at Barberton, O., which will be completed early in the spring.

A building permit has been issued to the National Iron Works, Ltd., Toronto, Can., for a brick foundry estimated to cost $20,000.

The Gardner Machine Co., Beloit, Wis., manufacturing disc grinders, has planned to increase its capital stock from $20,000 to $100,000 and to build an enlarged plant.

The Michigan Brass & Iron Works, Lansing, Mich., has just completed a new foundry which will enable the plant to double its output. The building is 50 x 150 feet.

The Jeffrey Mfg. Co., Columbus, O., advises that it is fabricating what steel is necessary for its new construction, and will also do its own work in erecting the proposed additions.

The Wilson Machinery Co., Des Moines, Ia., is equipping its two new buildings with machinery for the manufacture of gasoline engines especially adapted for farm work.

The Badger Brass Mfg. Co., Kenosha, Wis., advises respecting its increase of capital stock that it is not its purpose to make further enlargement to its plant at this time.

The Buffalo Co-Operative Stove Co., Buffalo, advises relative to the erection of an addition to its foundry that the new building is for storage purposes and will be fireproof.

The Provincial Steel Co., Cobourg, Ont., has let the contract for a 135-foot extension to its plant, work on which has been begun and will be hurried to completion.

The Peck Rolling Mills, Ltd., Montreal, advises that it will replace at the earliest possible moment both the wire nail stock building and the wire nail factory recently destroyed by fire.

The Inland Steel Casting Co., Terre Haute, Ind., is planning an addition to its plant estimated to cost $7,000. When the addition is completed it will almost double the number of employes.

The Gould Balance Valve Co., whose plant is now located at Kellogg, Ia., is planning to remove to Des Moines, where a new plant may be built at East Fourth street and Court avenue.

The Flint-Lomax Mfg. Co., Denver, Colo., has taken out a building permit to build an addition to its machine shop on Delgany, near Fifteenth street, at an estimated cost of $3,000.

Beall Bros., Alton, Ill., advise respecting their plans following the recent fire that they will rebuild at once, the proposed factory to have a capacity to produce twice as many shovels a day as the old one, and to be absolutely fireproof. Contracts have been let and the work will proceed at once. At the time of the fire the company was 8,000 dozen shovels behind with its orders, and was making between 200 and 250 dozen a day.

Two new annealing ovens have been constructed at the plant of the Union Malleable Iron Works, Moline, Ill., this being made necessary by rush of orders at the plant.

The Fulton Foundry & Machine Co., Atlanta, Ga., has purchased a tract of land on Angier avenue, upon which a foundry will be built for the manufacture of grates, frames and sash weights, etc.

The McKinnon Chain Co., Tonawanda, N. Y., is completing the construction of its plant on Fillmore avenue. The machinery equipment will be placed at once in the effort to start the plant in operation in January.

Joseph Obenberger & Son Co., Lake and Ferry streets, Milwaukee, is building an addition to its engine and forge shops, 40 x 62 feet, two stories, of brick and steel construction, at an estimated cost of $4,000.

The American Locomotive Co. has instructed the American Bridge Co. to begin work at once on the construction of a 3-story brick pattern shop at Dunkirk, N. Y., the foundation for which has been built. The building will cost $50,000.

The General Foundry Co., Pontiac, Mich., which is a partnership between Anthony Schomer of Detroit and Charles Howland of Pontiac, is equipping a building which will be opened as a foundry shortly, for the manufacture of brass, bronze and aluminum castings.

The Sharon Foundry Co. has awarded a contract to Alex Laughlin & Co., Pittsburg, for the construction of a new 20-ton open-hearth furnace at the company's plant at Wheatland, Pa. The new furnace will be used to alternate with the one now being operated.

The Elmira Machine Works, Grover, Pa., announces that it is now building a concrete block factory building, two stories, 32 x 120 feet, at Union, N. Y., where it will remove. Other buildings will be added in the spring, two and a quarter acres of land having been secured as a site alongside the Erie tracks and facing two streets. The company has purchased a 40-

horsepower automatic engine and will use electric drives throughout the plant. It has purchased a dynamo and will need some motors. The company manufactures specialties in metal and wood.

General Industrial:—

The Grant-Lees Machine Co., Cleveland, has increased its capital stock from $150,000 to $200,000.

The A. M. Byers Co. and striking Sons of Vulcan puddlers at the company's Girard, O., mill have settled their differences, and the men returned to work Dec. 9.

The National Machine & Foundry Co., Connellsville, Pa., which suspended operations two years ago, began running again last week. An addition is to be built to the plant.

A petition has been filed asking that the Matthews Steam Boiler Works Co., South Bend, Ind., be adjudged bankrupt by the various creditors representing claims aggregating $10,000.

The foundry of the Columbus Chain Co., Columbus, O., is being operated to capacity in all departments, and additional orders are being booked from the east and northwest for heavy chains.

Charles Outhwaite, receiver for the Capital Lock-Nut & Washer Co., Columbus, O., which went into the hands of receivers a year ago, has sent out checks in payment of all creditors' claims in full.

The Michigan Twist Drill Co., Detroit, has purchased the foundry building of the Detroit Steel Pulley Co., at Warren and Bellevue avenues. The drill company is occupying the property.

The Smith & Baldridge Machine Co., Detroit, whose incorporation was recently noted, with a capital stock of $50,000, plans to continue the business of a co-partnership which it succeeds. The officers of the company are President, H. D. Baldridge; secretary and treasurer, C. C. Smith.

The Schaub Machine Co., Logan, Utah, which has been in existence for several years, and has a modern machine shop operating, has been incorporated with a capital stock of $10,000, by President Jacob Schaub, Vice President Leonard Krogue, Secretary-Treasurer E. P. Bacon, Clara F. Bacon and Betty A. Schaub.

The North Alabama Rolling Mill Co. put its plant at Sheffield, Ala., in operation Dec. 6 after having completed much new construction. The plant was formerly operated by the Sheffield Rolling Mills Co., which went into bankruptcy following the panic of 1907. A new company took over the plant some months ago.

It is stated that the contract for the substructure of the new Quebec bridge has been awarded to M. P. Davis of Quebec at about $2,500,000, as compared with $1,500,000 the cost of the previous substructure, the plan calling for a considerable extension of the work.

C. O. Hamilton, manager of the Elyria Gas Engine Co., Elyria, O., has been appointed receiver of the company, upon application of Dr. D. C. Baldwin and George H. Ely. The Elyria Gas Engine Co. should not be confused with the Elyria Gas Power Co., which is the successor to the first named company and is in flourishing condition.

By an order of the court, the foundry of J. T. Carmody, Cedar Rapids, Ia., will be sold in order to make a cash disbursement to the heirs after the payment of the debts and the cost of administration. The administrators are A. T. Cooper and Allen MacDuff, who will consider propositions that may be presented to them.

The Dayton Castings Co., Dayton, O., whose incorporation was recently noted, advises that it expects to do a general jobbing business in gray iron castings, the capacity being about 25 tons per day. It has leased the foundry of the Craig-Reynolds company, which is already equipped. It expects to make the castings of the Craig-Reynolds furnace, which the old company formerly made itself.

The order for 1,000 tons of sheet steel piling recently placed by the Ontario Power Co., Niagara Falls, Ont., with the Jones & Laughlin Steel Co., will be used in the construction of an intake for an 18-foot diameter feed pipe along the river above the Canadian falls. The Ontario Power Co. has made several successive increases of its capacity and with the new construction will have three lines running to its plant.

Mention was made in the issue of Nov. 11 to the effect that the Miami Valley Machine Co., of Dayton, O., had made an assignment. This should have read the Miami Valley Machine Co., of Miamisburg, O. This company should not be confused with the Miami Valley Machine Tool Co., of Dayton, manufacturer of Miami Valley lathes, grinding machines, this latter company not being the one to which the original paragraph referred.

By a court order, the Industrial Trust Co., of Providence, R. I., has been authorized to sell the real and personal property of the Nichols & Langworthy Machine Co., of Hope Valley, R. I., under a mortgage deed for $125,000. Two defaults have been made by the machine company, one in payment of interest, and the other in the payment of a sinking fund provided for in the mortgage, according to the counsel for the petitioning trustee.

The Corrugated Culvert Co., Moberly, Mo., whose incorporation was recently noted, advises that it has been operating in Moberly for over a year as a co-partnership concern, but recently incorporated with $30,000 fully paid. The owners of its stock are E. R. Peters and John E. Pyle, of Emporia, Kans., and H. G. Saffer, of Moberly, Mo. The plant occupies 3,200 square feet of floor space and its building is equipped with the necessary machinery for turning out its product, which includes corrugated metal culverts, stock tanks, silos, grain bins, cisterns and other like articles of heavy metal.

The Kingston Ship Building Co., a newly-organized concern capitalized at $500,000, has secured from the Canadian government a lease for 21 years of the dry dock at Kingston, Ont., commencing April 15 next. The company will begin at once to install the plant, spending about $50,000 at first, but the outlay during the next three years will be about $150,000. The company is composed of Alex. McDougall, of Duluth, Minn.; Horace B. Smith, of Owen sound; Simon Dyment of Barrie; James M. Smith, of Collingwood; Hiram A. Calvin, John McKelvey and W. J. Fair, of Kingston. It is hoped to develop a big dock business, which was being lost to Kingston, because the present plant is inadequate, the locality being favorable for receiving the class of large freighters plying between upper lake ports and Montreal.

Fires:—

The shops of the Riley-Klotz Mfg. Co., Newark, N. J., were severely damaged by fire, causing a loss estimated at $60,000, partly covered by insurance.

The plant of the Seneca Chain Co., Kent, O., was damaged Dec. 10, the loss being estimated at $40,000, covered by insurance.

The blacksmith shop of the R. K. Le Blond Machine Tool Co., Cincinnati, O., was damaged to the amount of about $1.000 by fire Dec. 2.

The foundry of the Milwaukee Stove Works was seriously damaged Dec. 9, the loss being estimated at $20,000. The fire started from wood igniting on top of a core oven.